

University of California Publications in PSYCHOLOGY

VOLUME III

1918-1929

EDITORS

WARNER BROWN
GEORGE M. STRATTON
EDWARD C. TOLMAN



UNIVERSITY OF CALIFORNIA PRESS
BERKELEY, CALIFORNIA
1930

UNIVERSITY OF CALIFORNIA PRESS
BERKELEY, CALIFORNIA

CAMBRIDGE UNIVERSITY PRESS
LONDON, ENGLAND

CONTENTS

	PAGE
An Experimental Study of Abnormal Children, with Special Reference to the Problems of Dependency and Delinquency, by Olga Bridgman	1
Analysis of Package Labels, by Walter S. Heller	61
A Study of the Major Emotions in Persons of Defective Intelligence, by Beulah M. Morrison	73
Factors Contributing to the Delinquency of Defective Girls, by Jean Walker	147
The Judgment of Pitch as a Function of the Series, by S. R. Truman and E. G. Wever	215
Psychological Studies of Motion Pictures:	
II. Observation and Recall as a Function of Age, by H. E. Jones, assisted by H. Conrad and A. Horn	225
III. Fidelity of Report as a Measure of Adult Intelligence, by H. S. Conrad and H. E. Jones	245
IV. The Technique of Mental-Test Surveys among Adults, by H. S. Conrad and H. E. Jones	277
Index	279

UNIVERSITY OF CALIFORNIA PUBLICATIONS
IN
PSYCHOLOGY

Vol. 3, No. 1, pp. 1-59

March 30, 1918

AN EXPERIMENTAL STUDY OF ABNORMAL
CHILDREN, WITH SPECIAL REFERENCE
TO THE PROBLEMS OF DEPENDENCY
AND DELINQUENCY

BY

OLGA BRIDGMAN, M.D., PH.D.

UNIVERSITY OF CALIFORNIA PRESS
BERKELEY

UNIVERSITY OF CALIFORNIA PUBLICATIONS

Note.—The University of California Publications are offered in exchange for the publications of learned societies and institutions, universities and libraries. Complete lists of all the publications of the University will be sent upon request. For sample copies list of publications or other information, address the Manager of the University Press, Berkeley, California, U. S. A. All matter sent in exchange should be addressed to The Exchange Department, University of California Library, Berkeley, California, U. S. A.

OTTO HARRASSOWITZ,
LEIPZIG.

Agent for the series in American Archaeology and Ethnology, Classical Philology, Education, History, Modern Philology, Philosophy, Psychology.

R. FRIEDLAENDER & SOHN,
BERLIN.

Agent for the series in American Archaeology and Ethnology, Botany, Geography, Geology, Mathematics, Pathology, Physiology, Zoology and Memoirs.

PSYCHOLOGY.—George M. Stratton, Editor. Price per volume \$3.50.

Cited as Univ. Calif. Publ. Psychol.

- | | | |
|---------|---|-----|
| Vol. 1. | 1. The Judgment of Difference, with Special Reference to the Threshold, in the Case of Lifted Weights, by W. Pp. 1-71, 4 text figures. September, 1910 | |
| | 2. The Process of Abstraction, an Experimental Study, by Th. Moore. Pp. 73-197, 6 text figures. November, 1910 | 1.0 |
| | 3. The Judgment of Very Weak Sensory Stimuli, with Special Reference to the Absolute Threshold of Sensation for Common Salt, by Warner Brown. Pp. 199-268, plates 1-4. February, 1911 | .6 |
| | 4. Habit Interference in Sorting Cards, by Warner Brown. Pp. 269-321. April, 1911 | .5 |
| | 5. Diurnal Variations in Memory and Association, by Arthur I. Gates. Pp. 323-344. March, 1911 | .2 |
| | 6. Correlations and Sex Differences in Memory and Substitution, by Arthur I. Gates. Pp. 345-350. May, 1911 | .0 |
| Vol. 2. | 1. Variations in Efficiency During the Day, Together with Practice Effects, Sex Differences, and Correlations, by Arthur I. Gates. Pp. 1-158. March, 1911 | 1.5 |
| | 2. Experiments on Attention and Memory, with Special Reference to the Psychology of Advertising, by J. M. Levy. Pp. 157-197. March, 1911 | .4 |
| | 3. The Psychology and Physiology of Mirror-writing, by Justin K. Fuller. Pp. 199-265. May, 1911 | .7 |
| | 4. Memory and Association in the Case of Street-car Advertising Cards, by Walter S. Heller and Warner Brown. Pp. 267-275. May, 1911 | .10 |
| | 5. A Comparison of the Japanese Folk-Song and the Occidental: A Study in the Psychology of Form, by Sangoro Ito. Pp. 277-290. May, 1911 | .11 |
| | 6. Individual and Sex Differences in Suggestibility, by Warner Brown. Pp. 291-430. July, 1911 | 1.5 |
| Vol. 3. | 1. An Experimental Study of Abnormal Children, with Special Reference to the Problems of Dependency and Delinquency, by Olga Bridgman. Pp. 1-59. March, 1912 | .65 |

PHILOSOPHY.—George H. Howison, Editor. Price per volume \$2.00.

Cited as Univ. Calif. Publ. Philos.

The first volume of the University of California Publications in Philosophy appeared in November, 1904, and was prepared in commemoration of the seventieth birthday of Professor George Holmes Howison, under the direction of a committee of his pupils composed of Evander Bradley McGilvary, Charles Henry Rieher, Harry Allen Overstreet and Charles Montague Bakewell. The price of the volume is \$2. It may be had bound, or the paper may be obtained separately. Its contents are:

- | | | |
|---------|---|-----|
| Vol. 1. | 1. The Summum Bonum, by Evander Bradley McGilvary. Pp. 1-27 | .25 |
| | 2. The Essentials of Human Faculty, by Sidney Edward Mezes. Pp. 28-55 | .25 |
| | 3. Some Scientific Apologies for Evil, by George Malcolm Stratton. Pp. 56-71 | .15 |
| | 4. Pragmatism and the <i>a priori</i> , by Charles Henry Rieher. Pp. 72-91 | .20 |
| | 5. Latter-day Flowing-Philosophy, by Charles Montague Bakewell. Pp. 92-114 | .20 |
| | 6. Some Problems in Evolution and Education, by Ernest Norton Henderson. Pp. 115-124 | .10 |
| | 7. Philosophy and Science in the Study of Education, by Jesse Dismukes Burks. Pp. 125-140 | .15 |
| | 8. The Dialectic of Bruno and Spinoza, by Arthur Oncken Lovejoy. Pp. 141-174 | .25 |
| | 9. The Logic of Self-Realization, by Henry Waldgrave Stuart. Pp. 175-205 | .30 |
| | 10. Utility and the Accepted Type, by Theodore de Lopez de Laguna. Pp. 206-226 | .09 |

UNIVERSITY OF CALIFORNIA PUBLICATIONS
IN
PSYCHOLOGY

Vol. 3, No. 1, pp. 1-59

March 30, 1918

AN EXPERIMENTAL STUDY OF ABNORMAL
CHILDREN, WITH SPECIAL REFERENCE
TO THE PROBLEMS OF DEPENDENCY
AND DELINQUENCY

BY
OLGA BRIDGMAN, M.D., PH.D.

CONTENTS

	PAGE
I. Introduction	2
Opportunities for special studies; Definition of types of environment; Definition of the terms <i>dependency</i> and <i>delinquency</i> .	
II. Special study of the group of delinquent children	7
Offenses; Measurement of the intelligence by the Binet scale; Limitations to the use of the Binet scale; Employments; Parents; Environment.	
III. Special study of the group of dependent children	31
Age of the dependent children; Chronological and mental ages compared; Delinquent and dependent children compared; Parents of dependent children; Family status of dependent children; Employment of parents; Nativity of parents; Environment of dependent children.	
IV. Notes on cases in miscellaneous group	47
V. General conclusion	50
VI. Appendix: summary of typical case-histories	55

INTRODUCTION

The following study of abnormal children has been made in the Psychological Clinic of the Children's Out Patient Department of the University of California Hospital in San Francisco. The Psychological Clinic was established in January, 1911, under the direct supervision of the Department of Pediatrics of the Medical School and with the co-operation of the Department of Psychology of the University in Berkeley. It was created in response to a recognized demand for the special services it could render, in that many defective and peculiar children were appearing and were not being cared for satisfactorily. The Psychological Clinic has been most fortunate in its association with a medical school and hospital; through their special clinics it has been possible to determine accurately the child's physical condition and to observe the effects of appropriate care on his mental progress. With the assistance of the Social Service Department of the Hospital, information has been assembled as to home conditions—the social and financial standing of the family—and as to hereditary traits.

Opportunities for special studies. It has been possible in this clinic, perhaps largely because of its connection with a state university, to investigate certain particular problems which arise in connection with the study of mental deficiency. A large proportion of the children coming to the clinic are dependent or delinquent, and there is, as a consequence, an opportunity for studying the problems of dependency and delinquency and their relation to that of mental abnormality. It is also possible to a limited extent, to study the hereditary tendencies shown; this is due to the fact that, in most cases, the parents and brothers and sisters of the child can be consulted and observed personally. In several cases, it has been possible to make actual examinations of all the children in a family. This is necessarily an exceedingly limited study of hereditary tendencies, if it can

be considered such a study at all, but the observations that have been made are as accurate as actual personal contact with the individuals concerned can make them.

Definition of types of environment. Considerable stress has been laid on environmental conditions in this study. Under this title, we have discriminated as to *good environment*, *unsatisfactory environment*, and *bad environment*. It is simple enough to decide in extreme cases whether an environment has been uniformly good or bad, or where both conditions have existed, to draw a distinct line where the bad environment has left off and the good one begun. On the other hand, there are many cases where the distinction is not at all clear, where the environment has perhaps never been actually good, and at the same time never positively bad in the sense that the child has been surrounded by vicious influences. A child in an institution, for example, is not ordinarily considered as having a satisfactory environment. To be sure, this child is usually well fed and comfortably housed and clothed, but there is lacking that most important element, namely, personal contact and interest, which may be found even in a poverty stricken home, where proper food cannot always be obtained. Again, the child placing agencies place their children in boarding homes, but there is a vast difference in the homes which are found. Of course, the mental ability and physical appearance of the child itself determine the type of such a home to a large extent. Good homes, where the keenest sympathy is given, can be provided with comparative ease for the bright, attractive child. But the dull child, in poor health and of unprepossessing appearance, is not so easily provided for. This child may go from home to home, usually to the less desirable and more temporary homes, and because of the frequent changes, may actually be worse off than are some of the children in institutions. Then as to the institutions, there is as great a variation as in the foster homes. Certain of the smaller institutions are doing excellent work. Controlled as they are by trained persons, and with officers alert to their problem and to the personal needs of their charges,

they furnish homes which unquestionably surpass in efficiency many of the less desirable foster-homes. But in some of the less efficient orphanages, it is a different story; in such cases it must be agreed that even a poor foster-home would be a great improvement. Then too, the same environment will have an entirely different effect on different children, depending again on the child itself. Some children who are forced to look out for themselves to a greater or less extent even in early childhood develop a self-reliance and a strength of character which is quite remarkable, while other children of whom no greater requirements are made, become lawless and may go down completely because of lack of control and direction. Therefore, environment will have to be judged largely by the effect it has on the child and not in an abstract way. Poverty and privation may early bring out high traits of character in certain individuals, whereas in other cases, where there is less inherent strength, they result in the child's following the path of least resistance and developing the worst side of its character. In deciding as to environment, then, whether it is to be regarded as *good*, *bad*, or *unsatisfactory*, each child has been considered as an individual, and its surroundings have been judged, first, without regard to their influence on the child, and again, solely from the effect they have had on the child. An environment has not been classified as *bad* unless it was actually vicious and of a type to have a bad lasting effect even on the most promising child. Children in institutions and those in foster-homes have all been considered carefully and have been held as having had unsatisfactory or good surroundings as each particular case has seemed to warrant. This method of classification as to type of environment, unfortunately leaves much room for personal judgment, but it has been felt that the ultimate conclusions would be more fair than they could have been had whole groups of children—as for example, all children in foster-homes or all children in institutions—been placed in one or the other class, without special regard to the variations within each group.

Definition of dependency and delinquency.—The two most important terms used in this report are *dependency* and *delinquency*; and that there may be no uncertainty as to the exact sense in which the terms are used, it will be necessary to define the present usage of the terms as clearly as is possible. The term *delinquent* will herein be applied to: (1) all such children as have actually violated any state law or city ordinance; (2) all such as associate with vicious companions, absent themselves from home, or are growing up in circumstances that make it highly probable that they themselves will lead vicious or criminal lives. *Dependent* will be used in referring to those children who have no proper homes or guardians, where financial dependency is virtually the whole problem. A child will be called *delinquent* whenever it has acquired such knowledge or habits as make it an undesirable companion for other children, and *dependent* only where there are present no such traits to be overcome, and where the child has shown no marked abnormality of character, that makes it an undesirable companion for other children. By making use of such a distinction as this it will not be difficult to make a division into the two classes, in which the necessary care to be provided will be clearly of a different type. This terminology is in the main in accordance with the definitions of dependency and delinquency which occur in most of the juvenile court laws in this country. A few of the older laws still adhere to the old terminology, including under the heading *delinquency* only such children as have violated statutes or ordinances or are incorrigible, leaving out of consideration the large number of children who, because of bad environment or inherent anti-social tendencies, are in serious "danger of coming to lead criminal or dissolute lives." On the other hand, in the juvenile court law enacted in California in 1913,¹ the term *neglected child* was introduced, to refer to the same class of children as is ordinarily regarded as *dependent*.

¹ The new Juvenile Court Law of California, passed in 1915, does not distinguish by definition the various groups of children but refers to them all simply as "wards of the Court."

A delinquent child according to this law, is one who has violated some statute of the state or some city ordinance. A dependent child is one who is in serious danger of growing up to lead a criminal or dissolute life. This distinction has been made on account of a growing objection to the term *delinquent*, because of the stigma it attaches to the child and of the difficulty it raises later in attempts to provide for him an honorable place in the community. This feeling is in accord with the general opinion of those working with the children in the courts, that since these are only the victims of unfortunate circumstances, it should not be possible to attach to them any blame or responsibility for their unfavorable situation. Nevertheless, for the sake of convenience, the term *delinquency* will be used in this report in the same sense in which it is used in the states of Alabama, Colorado, Illinois, Indiana, Kentucky, Louisiana, Michigan, Minnesota, Missouri, Nebraska, Ohio, Tennessee, Texas, Utah, and Washington, in all of which states the law regards as delinquent any child who (a) violates a state law or a city or village ordinance; (b) is incorrigible; (c) knowingly associates with thieves, vicious or immoral persons; (d) absents himself from home without the consent of parent or guardian, or for no sufficient cause; (e) is growing up in idleness or crime; (f) knowingly visits or enters a house of ill-fame; (g) visits gambling houses or saloons; (h) wanders on the streets at night or about railroad yards or tracks; (i) jumps off and on trains; (j) enters a car or engine without authority; (k) uses vile, obscene or indecent language, or (l) is immoral or indecent. In short, a delinquent child is one who needs the supervision of the court, both for the furtherance of his own interests, and for the interests of the community in which he lives.

This study has been made of the first four hundred and fifty cases coming to the clinic from January, 1914, to January, 1915. These cases were drawn from widely varying sources, the vast majority, however, coming from public institutions such as the juvenile court, or charity organizations.

SPECIAL STUDY OF THE GROUP OF DELINQUENT CHILDREN

Of the total number of children examined, two hundred and five have been classified as delinquent. These children have been sent to the clinic for mental examination by several different public agencies but the largest number are juvenile-court cases. Of the total of two hundred and five cases, one hundred and eighty-five were referred to the clinic by the juvenile court, ten came from other departments of the University of California Hospital, and there were scattered cases from various other sources.

TABLE 1. AGENCIES SENDING DELINQUENT CHILDREN FOR MENTAL EXAMINATION; NUMBER OF CASES

Juvenile Court	185
University of California Hospital	10
Public Schools	2
Associated Charities of San Francisco	1
St. Francis Technical School	1
City and County Hospital	
St. Catherine's Home	
Detention Hospital	
Boys and Girls Aid Society	
Protestant Orphan Asylum	
Children's Home-Finding Society	
Total	205

TABLE 2. OFFENSES OF DELINQUENT CHILDREN

Boys

Stealing	43
Incorrigibility	33
Truancy	24
Running away from home	13
Vagrancy	10
Bad personal sex habits	9
Immoral sex relations	5

Girls

Immoral sex relations	83
Incorrigibility	24
Running away from home	8
Bad personal sex habits	6
Truancy	2
Drunkenness	2

Offenses of delinquent children.—Of the delinquent children examined, ninety-eight were boys and one hundred and seven girls. These children, who came from widely different homes; were brought to the attention of their guardians as delinquent for a variety of reasons. Of the total number of delinquent children, sixty-two were dependent as well. These dependent delinquents have been included in the statistical tables of the delinquents but not in those of the dependents. The offenses committed show considerable variation with sex. Forty-three of the boys classified as delinquent had been guilty of stealing, this being the commonest form of delinquency on the part of the boys. None of the girls, on the other hand, had been guilty of stealing as the primary offense, but eighty-three had been guilty of sex immorality. Some of these differences may be fairly easily explained. In their earlier years, boys are allowed much greater freedom from supervision than are girls, and as a result a much smaller number of little girls appear before the juvenile court than of little boys. Also, boys are brought before the court on much less provocation than are girls and as a result of this tendency to shelter girls from the disgrace associated with a court hearing, they seldom appear until they have committed some comparatively serious offense and it is imperative that active measures be taken to improve the situation. The average age of the boys is approximately thirteen years, and there are more thirteen-year-old boys than any others appearing in the group of delinquents. The average age of the girls is roughly fifteen years, approximately two years greater than that of the boys. However, there are far more sixteen-year-old girls in the delinquent group than of any other age.

TABLE 3.—DISTRIBUTION OF DELINQUENT CHILDREN ACCORDING TO
CHRONOLOGICAL AGE

<i>Boys</i>		<i>Girls</i>	
6 yrs.....	1	4 yrs.....	1
7 ".....	1	8 ".....	1
8 ".....	4	9 ".....	1
9 ".....	10	10 ".....	2
10 ".....	3	11 ".....	2
11 ".....	5	12 ".....	2
12 ".....	12	13 ".....	5
13 ".....	17	14 ".....	10
14 ".....	12	15 ".....	11
15 ".....	10	16 ".....	25
16 ".....	10	17 ".....	19
17 ".....	9	18 ".....	15
18 ".....	1	19 ".....	7
19 ".....	1	20 ".....	1
25 ".....	1	21 ".....	1
26 ".....	1	23 ".....	2
	—	24 ".....	1
Total	98	31 ".....	1
		Total	107

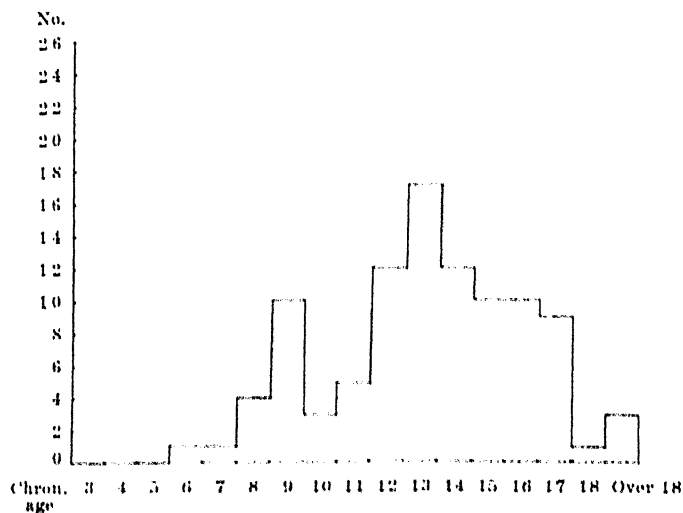
TABLE 4.—DISTRIBUTION OF DELINQUENT CHILDREN ACCORDING TO
MENTAL AGE

<i>Boys</i>		<i>Girls</i>	
2 yrs.....	1	5 yrs.....	1
5 ".....	2	6 ".....	1
6 ".....	3	7 ".....	4
7 ".....	4	8 ".....	3
8 ".....	7	9 ".....	15
9 ".....	16	10 ".....	16
10 ".....	17	11 ".....	26
11 ".....	26	12 ".....	18
12 ".....	9	15 ".....	21
15 ".....	10	18 ".....	2
18 ".....	2		—
9 ".....	1	Total	107
	—		
Total	98		

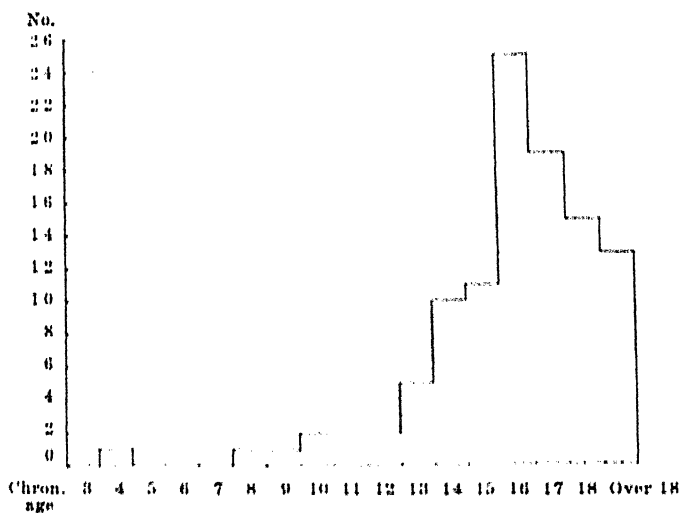
TABLE 5.—DISTRIBUTION OF DELINQUENT CHILDREN ACCORDING TO
CHRONOLOGICAL AND MENTAL AGES

<i>Boys</i>														
Mental age	2	3	4	5	6	7	8	9	10	11	12	15	18	? Total
Chron. age														
6	1	..	..	..	..	..	..	..	1
7	1	..	..	..	..	..	..	..	..	..	..	..	..	1
8	1	1	1	1	..	..	..	..	4
9	1	1	..	2	..	3	2	..	..	..	9
10	1	2	..	..	..	..	3
11	1	1	1	1	1	..	..	5
12	1	6	3	..	2	..	..	12
13	1	..	..	..	2	3	9	2	..	..	17
14	1	1	..	4	..	5	..	1	..	12
15	1	1	..	..	2	2	1	2	2	11
16	1	..	1	3	2	3	..	10
17	1	1	4	1	2	..	9
18	1	..	1
Over 18	1	..	..	..	..	1	..	3
Total	1	..	..	2	3	4	7	16	17	26	9	10	2	98

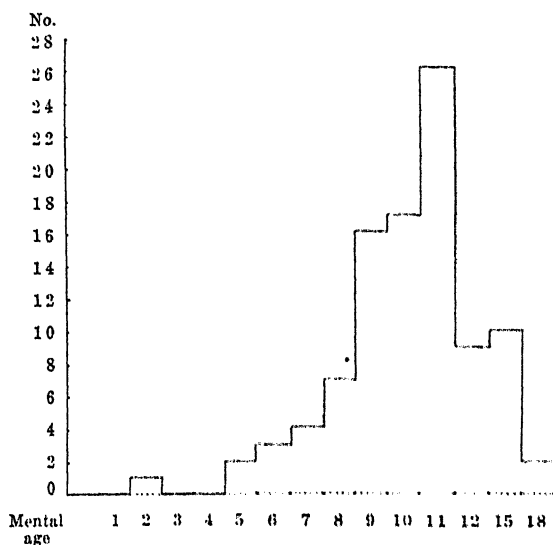
Girls												
Mental age	4	5	6	7	8	9	10	11	12	15	18	Total
Chron. age												
4	--	--	1	--	--	--	--	--	--	--	--	1
5	--	--	--	--	--	--	--	--	--	--	--	--
6	--	--	--	--	--	--	--	--	--	--	--	--
7	--	--	--	--	--	--	--	--	--	--	--	--
8	--	--	--	--	1	--	--	--	--	--	--	1
9	--	1	--	--	--	--	--	--	--	--	--	1
10	--	--	--	1	--	1	--	--	--	--	--	2
11	--	--	--	--	--	--	--	2	--	--	--	2
12	--	--	--	--	--	1	--	1	--	--	--	2
13	--	--	--	--	--	1	--	3	1	--	--	5
14	--	--	--	1	--	--	2	2	4	1	--	10
15	--	--	--	--	1	--	2	3	2	3	--	11
16	--	--	--	--	--	4	4	9	3	5	--	25
17	--	--	--	--	1	1	1	4	5	7	--	19
18	--	--	--	--	--	2	4	2	2	3	2	15
Over 18	--	--	--	2	--	5	3	--	1	2	--	13
Total..	--	1	1	4	3	15	16	26	18	21	2	107



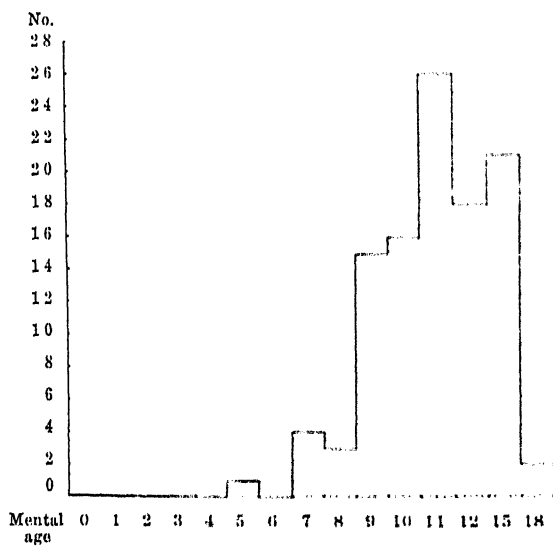
Graph 1. Distribution of delinquent boys according to chronological age.



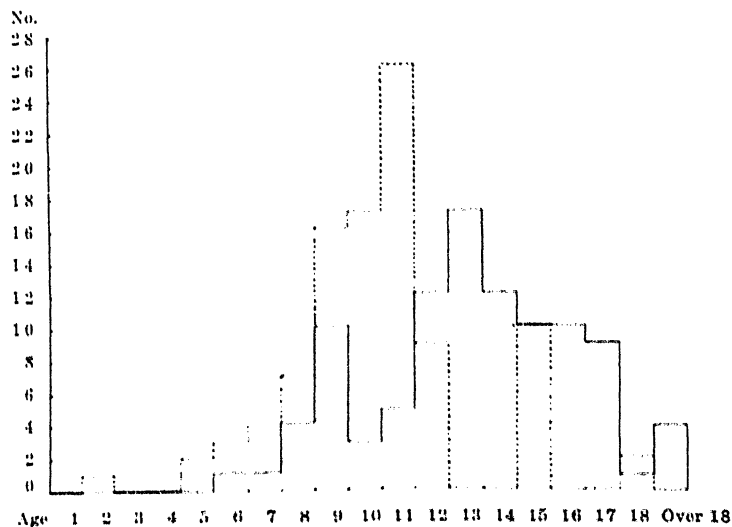
Graph 2. Distribution of delinquent girls according to chronological age.



Graph 3. Distribution of delinquent boys according to mental age.

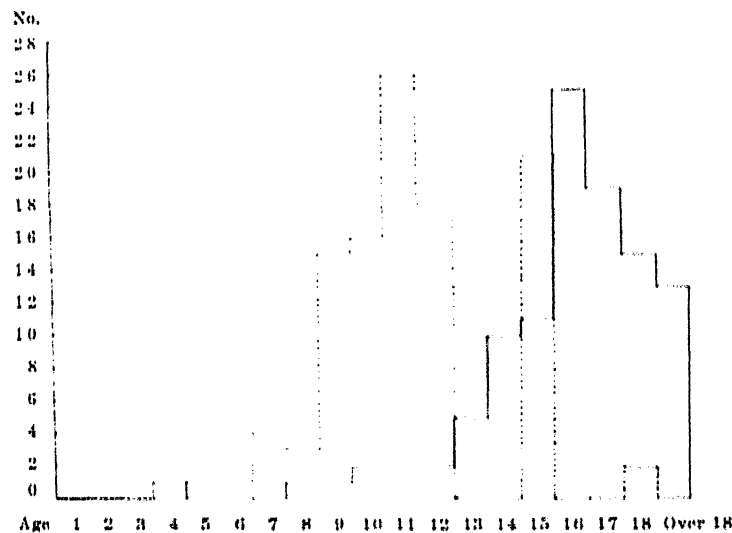


Graph 4. Distribution of delinquent girls according to mental age.



Graph 5. Comparison of mental and chronological ages of delinquent boys.

Mental age, dotted line.
Chronological age, solid line.



Graph 6. Comparison of mental and chronological ages of delinquent girls.

Mental age, dotted line.
Chronological age, solid line.

Measurement of intelligence by the Binet scale. Inspection of the preceding tables and graphs brings out several rather striking facts. In the case of both boys and girls, the mental age is lower than the chronological age, and in both groups there are more delinquent children having a mental age of eleven years than any other. This is a mental age about which there is considerable debate, and not a few conservative persons feel that a child having this mental age, no matter how much older he is according to chronological age, should not be considered as being actually feeble-minded. It is probably true that there are individuals who are not above eleven years in mental age who are not feeble-minded in any sense. Occasionally special factors enter in, such as marked lack of normal educational opportunities, or lack of fluency in the use of English, this latter difficulty showing in foreign-born persons or even in American-born children when a foreign language is spoken in the home.

There is another type of case, found oftener in agricultural districts than in cities, in which the ability to think in abstract terms is very poorly developed. Persons of this type may be physically vigorous and capable of managing their affairs in a foresighted way, while decidedly below the average in their ability to acquire book knowledge. They are usually the descendants of generations who have lived by using their hands rather than their wits; thus with an innate lack of interest in school work, if not an actual distaste for it, they fail to profit by scholastic training and remain dunces throughout their school course. Along practical lines, however, and in the particular directions in which their interests extend, they show marked ability and keenness. But such cases as these are unusual and stand out from the group of really defective persons because of the peculiar features which have been mentioned.

As a rule the child brought up under average conditions, who has a mental age of only eleven years after having attained a chronological age of fifteen years or more, is a defective person

as judged by other standards than the Binet scale alone. A good many of these children are very deceptive in their appearance of intelligence and under favorable circumstances they may never stand out from the rest of society as being abnormal. They are, however, distinctly below the average in all kinds of ability, and are peculiarly unable to adapt themselves to trying or unusual circumstances. They make up to a considerable extent the great body of incompetents, often become vicious and criminal, and form a large part of those groups who are in chronic need of aid from public charities, or who fill the almshouses, jails and prisons of this country. The fact that a few of them under favorable conditions seem to be able to look after themselves without special care, does not make the class as a whole any the less dangerous, and it seems obvious that for most of them the exercise of full personal liberty should be limited in some way if they are to be supervised in anything like an adequate manner. They must always be regarded as potentially anti-social and should be taken in charge by the state at as early an age as possible. If this were done in a wise and humane way, it would probably do away with a great deal of petty crime and would diminish to a great extent the number of women becoming prostitutes. The group of children, then, having a mental age of eleven years and retarded more than four years mentally, will, in this paper, be included in the moron group. Those children with a mental age of twelve years who are retarded more than four years are classified as defective, but are not considered feeble-minded. Those children with a mental age of fifteen years or over have in every case been regarded as having normal intelligence. This terminology and method of classification is in the main in accordance with that described by E. B. Huey² and Henry H. Goddard.³

² Huey, E. B., *Backward and feeble-minded children*. Baltimore, Warwick and York, 1912, pp. 4-10.

³ Goddard, H. H., *Feeble-mindedness: its causes and consequences*. New York, Macmillan, 1914, pp. 4-6.

TABLE 6.—DIAGNOSIS OF DELINQUENT CHILDREN AS GRADED BY THE
BINET SCALE

Idiot	1
Imbecile	5
Moron	69
Defective	14
Backward	50
Normal	64
Precocious	1
? (Insane)	1
<hr/>	
Total	205

Of the whole group of two hundred and five cases, seventy-five have been graded as feeble-minded, a proportion of approximately 32 per cent, this percentage including those cases indicated in table 6, as *idiots*, *imbeciles* and *morons*. Of those referred to as defective, some will probably deteriorate and finally fall into the class of children actually feeble-minded, and in the *backward* group a considerable proportion will almost certainly fail to develop normally and will later have to be regarded as feeble-minded persons. Those children having normal intelligence as estimated by the Binet scale are interesting, indeed puzzling. Of this number comparatively few can be regarded as average children. Thirteen out of a total of sixty-five, or 20 per cent, seem quite normal and apparently have become delinquent only because exposed to especially unfavorable conditions or because of a marked lack of the supervision and training which falls to the lot of the average child. The delinquency in these cases might almost be considered accidental, as something from which the child could have been protected with little difficulty. For these children it is only necessary to provide favorable surroundings, and good results may be hoped for. But as to the rest, the problem is a different one. All of these have manifested, either because of innate tendencies or because of long-continued bad environment, serious defects of character. It is undoubtedly true that had they been placed in favorable conditions, many of these children would

at the present time to all intents and purposes have been normal. It is a most unfortunate thing, that those children with bad hereditary tendencies, who have the greatest need of careful moral and mental training, and who should be protected both from mental and physical excesses, should be those who are most exposed to moral and physical dangers. It is such individuals as these who represent the first stages on the downward road toward mental disease, who are responsible for much of the crime which is committed, and who become the parents of true defectives.

Limitations to use of Binet scale. Table 7 suggests the limitations to the use of the Binet scale as the only method of examination. Surely nothing could be more absurd or misleading than to regard as normal the group of children here tabulated, simply because, according to the intelligence scale, they have a normal or at least approximately normal mental age.

TABLE 7. DELINQUENT CHILDREN GRADED AS NORMAL BY THE
BINET SCALE

Apparently normal in every way	13
Persistently immoral sexually	14
Generally irresponsible	13
Constitutionally psychopathic	8
Guilty of inveterate thieving	7
Obsessed with <i>Wandertlust</i>	5
Perverted sexually	3
Wantonly cruel	1
Insane (now in asylum)	1
Total	<hr/> 65

Binet, himself, in the use of his scale, made no pretense of dealing with all sides of a complex nature, and though this system of tests furnishes a surprising variety of information, it nevertheless gives far from the whole story. First of all, it is necessary to know what opportunities a child has had in his own home and neighborhood. Then hereditary tendencies must be taken into consideration. And perhaps most important of

all, it is necessary to understand the child's point of view, his attitude toward persons and things, and his emotional response to his experiences and to situations which he is called upon to meet. A careful interpretation of even such simply conducted tests as those in the Binet scale gives some information along all of these lines, but not nearly enough. In the actual administration of tests made in this study, the method of examination which has given most satisfaction has been the use of the Binet scale as modified by Henry H. Goddard, supplemented by a large number of tests designed to emphasize some points which the Binet tests merely touch upon and to test more thoroughly such complex faculties as persistence, interest, judgment and ability to make more or less complicated associations. The Binet scale has one very important point in its favor; it gives a definite and communicable finding. In making use of the results of mental examinations of delinquent children it is necessary that the reports be made intelligible to those officials who finally rule as to the child's further care. The terms *mental age* and *retardation* are easily made clear to anyone, which is a great advantage; but when these tests are used indiscriminately the results may be and often are misleading, and the whole system may work to the detriment of the child and of the scale itself, by creating impressions which are not justifiable.

Employments of delinquent children.—The occupations under which these children can be grouped, to a large extent fall into a few important classes. More children are still in school than are employed in any other way, eighty-six, or 42 per cent, being school children. Fifty, or 24 per cent, are not employed in any remunerative way even though they are out of school. The paid occupations in which these children have been engaged are similar, requiring no previous training and but little intelligence. Thirty-four, or approximately 17 per cent, are engaged in domestic service. This large proportion of delinquent children, nearly all girls, employed as domestic servants does not necessarily point to this as an undesirable occupation, or as one which by its very nature contributes to delinquency. Domestic service

TABLE 8.—OCCUPATIONS IN WHICH DELINQUENT CHILDREN HAVE BEEN
ENGAGED

Schoolchild	86
Without employment	50
Domestic servant	34
Factory worker	6
Housewife	4
Cashier	3
Newsboy	3
Laborer	2
Messenger	2
Saleswoman	2
Wagon-boy	1
Cashgirl	1
Prize-fighter	1
Telephone operator	1
Stockgirl	1
Clerk in ice-cream parlor	1
Candy packer	1
Gardener's helper	1
Office boy	1
Comptometer operator	1
Multigrapher	1
Of unknown occupation	2
Total	205

is almost the only occupation by means of which an untrained, often sadly incompetent girl can obtain for herself food and a comfortable room. For girls who are at best capable of doing only routine work and who are not trained to do that, there is no other alternative than housework; many of the girls themselves admit that they dislike this work, but cannot in any other way earn enough to live. The problem of training incompetent individuals to some useful employment and of providing employment for them, is one whose solution has been attempted only in a small way, though the need of effective measures for looking after these individuals is a very pressing one. At the present time it is a pitiful reflection on the inadequacy of relief measures, that so many charitable agencies and penal institutions find it necessary to regard the marriage of a delinquent girl, even though she may be known to be mentally defective, as the best

possible solution of the problem of her case. This may relieve present conditions to a slight extent; it at least transfers the legal responsibility in most cases to other shoulders; but the situation will have to be faced by another generation, if not by this one, and the problem will not be easier to solve because of years of delay and shortsightedness in dealing with it. If defective-delinquent girls marry, they will probably marry persons like themselves. This seems to be a social law for which much evidence can be found. Their children will in all probability be at least as defective as themselves, and in another generation the whole situation will not have improved but will almost certainly have become more serious.

Parents of delinquent children: types of character. Even a brief and necessarily superficial study of the parents of this group of delinquent children shows that very many, though by no means all, are potentially if not actually anti social. Comparatively few of these children come from good homes, and poverty, vice and incompetency are the common findings. The parents are variously employed and except that there is a preponderance of seasonal and unskilled trades, and of those in which employment is very irregular, nothing is especially noticeable. (See table 10.) Table 9 shows in a general way

TABLE 9.—CONDITION OF PARENTS OF DELINQUENT CHILDREN.

Both parents inefficient	92
Both parents normal	33
Both parents unknown	26
One parent inefficient, the other unknown	33
Mother normal, father inefficient	9
Father inefficient, mother insane	2
Father inefficient, mother neurotic	2
Mother normal, father insane	2
Father normal, mother inefficient	1
Both parents neurotic	1
Both parents insane	1
Father normal, mother insane	1
Mother normal, father neurotic	1
Mother inefficient, father eccentric	1
Total	205

TABLE 10.—OCCUPATIONS OF PARENTS OF DELINQUENT CHILDREN

		<i>Father</i>	
Laborer	12	Electrician	1
Carpenter	10	Furniture merchant	1
Gang-foreman	5	Old-clothes man	1
Cook	5	Musician	1
Teamster	5	Gardener	1
Stevedore	4	Balloon-maker	1
Fruit-peddler	4	Travelling salesman	1
Stationary engineer	4	Piano-tuner	1
Physician	3	Architect	1
Longshoreman	3	Waiter	1
Janitor	3	Night-starter (ferry)	1
Chiropodist	2	Cobbler	1
Horse-trader	2	Candy-seller at theatre	1
Painter	2	Miner's helper	1
Machinist	2	Marble-worker	1
Fireman	2	Police officer	1
Candy-factory hand	2	Stationary fireman	1
Tailor	2	Civil engineer	1
Night watchman	2	Cabinet-maker	1
Restaurant manager	2	Soldier	1
Mattress-maker	2	Dyer and cleaner	1
Boiler-maker	1	Promoter	1
Post-office clerk	1	Special policeman	1
Bartender	1	Horse-trainer	1
Car-oiler	1	Iron-moulder	1
Real-estate agent	1	Porter	1
Stock accountant	1	Owner of cigar stand	1
Gambler	1	Tanner	1
Plaster-of-Paris statue maker..	1	No occupation	7
Proprietor of bakery and chophouse	1	Occupation unknown	81
Tinner	1	Total	205
Metal-roofer	1		
		<i>Mother</i>	
Housewife	118	Trained nurse	1
Servant by the day	11	Chambermaid	1
Laundry-worker	8	Dyer and cleaner	1
"Practical" nurse	3	Milliner	1
Manager of boarding-house ...	2	Real-estate dealer	1
Factory hand	2	No occupation	1
Telephone operator	1	Occupation unknown	51
Paper-seller	1		
Solicitor	1	Total	205
Waitress	1		

the types of parents of the delinquent children who have been studied. The term *inefficient* has been used of persons who are distinctly below normal, either in character or intelligence or both, persons who must be considered social failures. They may be well-meaning in every way, but unable to cope with situations at all complex; or they may be vicious and degenerate as well as incompetent. This group includes the drunken, immoral, generally shiftless and worthless individuals who seem often to recognize no responsibility, and who would be unable to bear it were it recognized. Of the total number of delinquent children, ninety-two, or 45 per cent, have both parents inefficient. Without doubt many of these parents are mentally defective and are of the same type as the children, having probably a mental age of eleven years or even less. Only thirty-three, or 16 per cent, of the delinquent children have both parents normal, as far as can be ascertained.

TABLE 11.—FINANCIAL STATUS OF FAMILIES OF DELINQUENT CHILDREN

Dependent on public aid	
Children in institutions	39
Children whose families are in chronic need of aid	15
Children in foster-homes	5
Widows' pension cases	3
<hr/>	
Total	62
Independent of public aid	
Children with poverty in homes	47
Children with vicious homes	44
Children with brutal parents	1
Children with good homes	49
Insufficient data	2
<hr/>	
Total	143

Presence or absence of parents.—Table 12 shows the number of cases in which one parent is absent from the home either because of death or desertion. This tabulation takes into account only the fact of the presence or absence of one or both of the parents, entirely without regard to the character of the

parent. Some parents who are living and apparently providing a home, are most undesirable in character, and in some cases it is known that parents who are dead were in every way normal. The presence or the absence of the parents from the home is of importance only in so far as it shows a relationship between delinquency and abnormal family situations. In thirty-two cases the mother is absent from the family, four mothers having

TABLE 12.—FAMILY STATUS OF DELINQUENT CHILDREN, ACCORDING TO PRESENCE OR ABSENCE OF PARENTS

Both parents living together	71
Father living, mother dead or unknown	28
Father dead or unknown, mother living	43
Mother at home, deserted by father	21
Father at home, deserted by mother	4
Both parents dead or unknown	32
Both parents deserted	3
No information	3
Total	205

deserted and twenty-eight being dead or unknown. On the other hand, in sixty-four cases the fathers are absent from the family, twenty-one fathers having deserted and forty-three being dead or unknown. In just twice as many instances then is the father the missing parent when only one is absent. That dependency should result more often because of absence of father than of mother may be explained in part by two facts: First, that the mother when left alone is more helpless, largely for financial reasons, than is the father, hence the children lack more of the necessary supervision than when the father is left alone, the father being able to provide servants or other care. Second, the desertion of the family is more common by the father than by the mother. Table 13 shows the families, already included in

TABLE 13. PARENTS NOT LIVING TOGETHER

Divorced	10
Separated	21
Total	31

table 12, where the parents are not living together. Of these families, thirty-one in all, ten parents have been divorced and the rest have voluntarily separated, or one parent has deserted.

Nativity of parents.—Of the parents of the delinquent and the dependent children, tabulations have been made of the place of birth, and the results compared with the corresponding re-

TABLE 14.—NATIVITY OF DELINQUENT CHILDREN

Native-born of native parentage	73	36%
Native-born of mixed parentage	16	8%
Native-born of foreign parentage	61	30%
Foreign-born of foreign parentage	22	10%
Parentage unknown	33	16%
Total .	205	100%

NOTE.—The term *mixed* in this and other tables means that one parent is native-born, the other foreign-born.

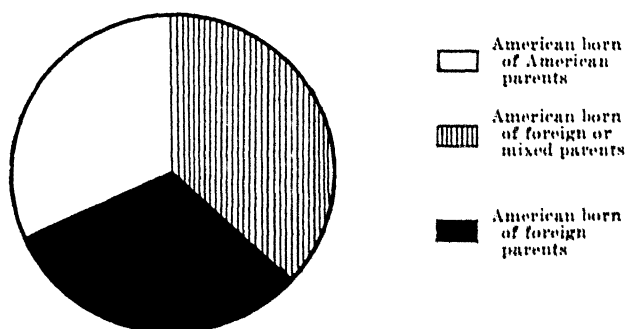
TABLE 15.—NATIVITY OF DEPENDENT CHILDREN

Native-born of native parentage	34	26%
Native-born of mixed parentage	8	6%
Native-born of foreign parentage	44	33%
Foreign-born of foreign parentage	13	9%
Parentage unknown	34	26%
Total .	133	100%

TABLE 16.—PARENTAGE OF THE POPULATION OF SAN FRANCISCO
U. S. CENSUS REPORT, 1910

Native-born of native parentage	31.4%
Native-born of foreign or mixed parentage	36.9%
Foreign-born of foreign parentage	31.4%

ports in the last United States Census. Comparisons have first been made of the two large groups, the American-born and the foreign-born, and in another table the nationalities of the foreign-born have been compared with one another. These comparisons are not entirely satisfactory. Many nationalities do not adapt themselves readily to the customs and requirements of this country during the first or even the second generation, hence the



Graph 7. Percentage of the population of San Francisco.

TABLE 17--POPULATION OF SAN FRANCISCO, NATIVE BORN OF FOREIGN PARENTS OR FOREIGN-BORN LISTED UNDER NATIVE COUNTRY OF PARENTS, COMPUTED FROM 13TH U. S. CENSUS REPORT, 1910

Ireland	54,413
Germany	48,890
Italy	27,124
England	14,050
Sweden	9,736
France	8,931
Canada	8,073
Russia	6,825
Austria	6,315
Scotland	5,240
Norway	4,735
Denmark	4,343
Switzerland	3,832
Greece	2,274
Finland	1,846
Mexico	1,763
Australia	1,347
Hungary	1,247
Spain	1,170
Wales	693
Portugal	370
Holland	300
All others	24,350
Total	238,167

TABLE 18.—NATIVE COUNTRY OF FOREIGN-BORN PARENTS OF
DELINQUENT CHILDREN

Both parents born in	
Italy	22
Ireland	12
Germany	9
France	4
England	3
Portugal	3
Austria	3
Russian Poland	2
Russia	2
Spain	2
Mexico	1
Porto Rico	1
Norway	1
Canada	1
Sweden	1
Both parents foreign, but from different coun- tries	
	16
Total	
	83

TABLE 19.—NATIVE COUNTRY OF FOREIGN-BORN PARENTS OF
DEPENDENT CHILDREN

Both parents born in	
Italy	12
Spain	8
France	7
Ireland	5
Germany	3
Porto Rico	3
Chile	2
Mexico	2
Hawaii	2
Portugal	1
Russia	1
Both parents foreign but from different coun- tries	
	11
Total	
	57

TABLE 20.—NUMBER OF DEPENDENT AND DELINQUENT CHILDREN IN SAN FRANCISCO RELATIVE TO TOTAL POPULATION OF FOREIGN PARENTAGE, OR FOREIGN-BORN

Population of San Francisco foreign-born or of foreign parentage		Delinquents	Dependents
Ireland	54,413	12	5
Germany	48,890	9	3
Italy	27,124	22	12
England	14,050	3	..
Sweden	9,736	1	..
France	8,931	4	7
Canada	8,073	1	..
Russia	6,825	4	1
Austria	6,315	3	..
Scotland	5,240	..	..
Norway	4,735	1	..
Denmark	4,243	..	..
Switzerland	3,832	..	..
Greece	2,274	..	..
Finland	1,846	..	..
Mexico	1,763	1	2
Australia	1,347	..	..
Hungary	1,247	..	..
Spain	1,170	2	8
Wales	693	..	..
Portugal	570	3	1
Holland	500	..	..
All others	24,350	17	18
Total	238,167	83	57

conditions found among the immigrants often continue among persons born in this country. In nearly all of our large cities there are whole districts where the population, though made up to a large extent of persons born in the United States, still continues to use its own language, the social condition here resembling that under which they lived in their own country rather than that commonly found in this. These groups, though American-born, are still unassimilated immigrants; this difficulty of nationality is one which cannot be overlooked in working with them. A rather striking thing in tables 14 and 15 is the small proportion of delinquents and dependents found in the group of

TABLE 21.—DATA OF TABLE 20 RESTATED AS RATIOS TO THE TOTAL GROUPS

Country	Total, foreign derived population of San Francisco	Delinquent	Dependent
Ireland .....	.228	.145	.088
Germany .....	.205	.109	.053
Italy .....	.114	.265	.211
England .....	.059	.036	.....
Sweden .....	.041	.012	.....
France .....	.038	.048	.123
Canada .....	.034	.012	.....
Russia .....	.029	.048	.017
Austria .....	.027	.036	.....
Scotland .....	.022	.....	.....
Norway .....	.019	.012	.....
Denmark .....	.018	.....	.....
Switzerland .....	.016	.....	.....
Greece .....	.010	.....	.....
Finland .....	.008	.....	.....
Mexico .....	.007	.012	.035
Australia .....	.006	.....	.....
Hungary .....	.005	.....	.....
Spain .....	.005	.024	.140
Wales .....	.003	.....	.....
Portugal .....	.002	.036	.017
Holland .....	.002	.....	.....
All others .....	.102	.205	.316
Total	1.000	1.000	1.000

foreign-born persons, and the comparatively large number of dependents and of delinquents in the group of native-born of foreign or mixed parentage. This may in part be explained by the fact that the larger number of foreign-born persons are above the age at which they would come before the juvenile court when first admitted to this country, so that the number of foreign-born juvenile delinquents would not represent the correct proportion of delinquency actually occurring in the foreign-born population. However, the proportions of dependents and delinquents in each foreign nationality as compared with the population of that foreign nationality in San Francisco, correspond rather closely.

As has already been pointed out, the number of cases available for this study is not sufficient to make the results conclusive, though they agree on the whole with conclusions of other investigators. As regards the different nationalities represented, the most striking single fact brought out is the comparatively large number of Italians having dependent and delinquent children. More children of Italian parentage are delinquent than of any other, whereas, relative to the number of population, Italy is third on the list as determined by the thirteenth United States Census, and far below either Germany or Ireland. (See table 17.) This result tends to confirm the idea, already common, that the Italians as they are now coming into this country—that is, from southern Italy and Sicily—are on the whole undesirable additions to the population. An interesting fact with regard to Germany is brought out by comparing the percentage of delinquent children with that of the dependents. Approximately 11 per cent of the total number of delinquent children are the children of German-born parents, while only 5 per cent of the dependents are of German parentage. In the case of the Italians, on the other hand, the percentages indicating delinquency and dependency are much more nearly equal. These facts would suggest that the difficulty with the Italian group is a rather marked inability to cope with the situation met in city life, whereas with the Germans this difficulty is not prominent. The delinquency of the Italians may be purely secondary, due to their lack of adaptability to trying conditions, whereas in the case of the Germans other factors enter in.

Environment of delinquent children. Table 22, showing the environment of delinquent children, judged according to the scheme previously described (see pp. 3 ff.), shows that in the vast majority of cases the surroundings in which these unfortunate children have developed have been very far from desirable. Of the two hundred and five delinquent children, only forty-seven, or 23 per cent, have had such an environment as falls to the lot of the average child. Sixty, or 29 per cent, have

TABLE 22.—ENVIRONMENT OF DELINQUENT CHILDREN: CASES UNDER E

Environment always good	47	23%
Environment always bad	60	29%
Environment always unsatisfactory	94	46%
Environment unknown	4	2%
Total	205	100%

grown up in positively vicious surroundings, while ninety-four or 45 per cent, have had surroundings which were not satisfactory, though they were not actually vicious. The problem of the unsuccessful home, therefore, is seen to loom large in the whole problem of delinquency. Heredity is probably the important factor in the production of actual feeble mindedness, but in the causation of delinquency, environment is as large a factor as heredity, if not a larger one. It has been well said that heredity gives the plasticity of the substance, environment the mould into which it is poured. Hence, since it is recognized that the development of the moral sense depends to a large degree on the early training and environment, it must also be agreed that much of juvenile delinquency is directly the result of a defective environment. To be sure, defective or markedly abnormal parents could hardly give their children normal homes so that, in very many cases, the children with bad hereditary tendencies are also subjected to the worst possible surroundings. That they themselves should be abnormal is the only possible outcome.

SPECIAL STUDY OF THE GROUP OF DEPENDENT CHILDREN

The next group to be considered will be the group of dependent children. Of the total number of children coming to the clinic, one hundred and thirty-three were dependent to a large extent on public aid. These children were for the most part referred to the clinic by public agencies, the great majority coming from the associated charities' organizations and the juvenile courts. The following table shows the distribution of dependent children according to the agencies interested in their care. The dependent children, as a whole, are probably less

TABLE 23.—AGENCIES REFERRING DEPENDENT CHILDREN TO THE CLINIC;
NUMBER OF CASES

Associated Charities	56
Juvenile Court	35
Roman Catholic Orphan Asylum	13
Catholic Humane Bureau	7
University of California Hospital	5
Pacific Hebrew Orphanage	4
Widows' Pension Bureau	2
Children's Home Society	2
Children's Hospital	2
Protestant Orphan Asylum	1
People's Place (Social Settlement)	1
Nurses' Settlement	1
Hebrew Board of Relief	1
State Children's Visitor	1
McKinley Orphanage	1
School	1
 Total	 133

TABLE 24.—SEX OF DEPENDENT CHILDREN

Boys	66
Girls	67
 Total	 133

representative of dependency than are the delinquents; it is therefore likely that in some instances the conclusions will be less accurate for the dependent cases. The larger number of these children are the children of parents who are almost continuously in need of aid from public agencies. However, a goodly number has been sent from orphanages and home-finding agencies and it has been gratifying to note a growing tendency on the part of such institutions to demand that a child, before being placed for adoption, shall have a clean bill of mental and physical health. This policy can hardly fail to increase the confidence of the public in the child-placing agencies and will perhaps also increase the number of careful and conscientious persons who will be willing to undertake the great responsibility of caring for dependent children in good homes.

Age of dependent children.—The average age of the dependent children is, as would be expected, less than that of the delinquents, and it is unfortunately true that as they grow older a certain proportion of the dependents, especially those whose parents are continuously in need of public aid and whose homes

TABLE 25.—DISTRIBUTION OF DEPENDENT CHILDREN ACCORDING TO
CHRONOLOGICAL AGE

<i>Boys</i>		<i>Girls</i>	
4 yrs.....	2	5 yrs.....	5
5 ".....	3	6 ".....	2
6 ".....	5	7 ".....	2
7 ".....	6	8 ".....	3
8 ".....	8	9 ".....	6
9 ".....	4	10 ".....	7
10 ".....	5	11 ".....	7
11 ".....	4	12 ".....	8
12 ".....	9	13 ".....	8
13 ".....	5	14 ".....	11
14 ".....	6	15 ".....	2
15 ".....	7	16 ".....	2
18 ".....	2	17 ".....	2
	—	25 ".....	1
Total	66	36 ".....	1
		Total	67

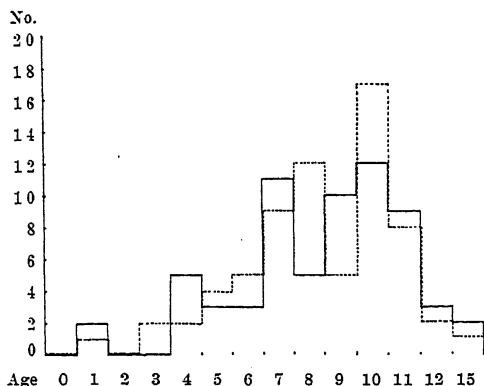
TABLE 26.—DISTRIBUTION OF DEPENDENT CHILDREN ACCORDING TO
MENTAL AGE

<i>Boys</i>		<i>Girls</i>	
1 yr.....	2	1 yr.....	1
4 yrs.....	5	3 yrs.....	2
5 ".....	3	4 ".....	2
6 ".....	3	5 ".....	4
7 ".....	11	6 ".....	5
8 ".....	5	7 ".....	9
9 ".....	10	8 ".....	12
10 ".....	12	9 ".....	5
11 ".....	9	10 ".....	16
12 ".....	3	11 ".....	8
15 ".....	2	12 ".....	2
?	1	15 ".....	1
<hr/>		<hr/>	
Total	66	Total	67

are not satisfactory, will become delinquent and will later be included in that group of dependents who are also delinquent. The average age of the dependent boys is ten years and of the dependent girls twelve years. The difference in age of the sexes may be accounted for, at least in part, by the fact that it is easier for young boys to become self-supporting than it is for girls; hence the boy falls out of the group of dependents more easily and at an earlier age than the girl.

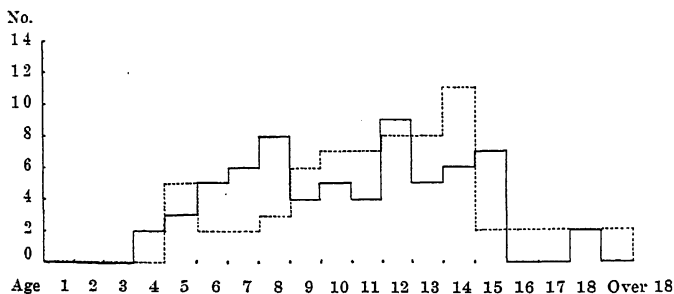
Chronological and mental ages compared.—The average mental age of the dependent children is almost the same for both boys and girls, being a little over eight years. A comparison of the mental with the chronological age shows that the average mental age of the boys is two years less than the average chronological age, while the average mental age of the girls is four years less than the chronological age. This would indicate, in at least this group of dependent children, that the girls are on the whole more backward than the boys. This may be partially explained by the fact that the boys as a group are younger and, as a result, defect does not show itself as clearly as it may in later years. The fact, too, that the boys are more likely than the girls to be held as delinquent on small provocation

would tend to make a larger number of the boys appear in the group of delinquents, where the average chronological age of the boys is greater than in the dependent group. It not infrequently occurs that, in the families where the girls are



Graph 8. Mental age of dependent boys and girls.

Boys, solid line.
Girls, dotted line.



Graph 9. Chronological age of dependent boys and girls.

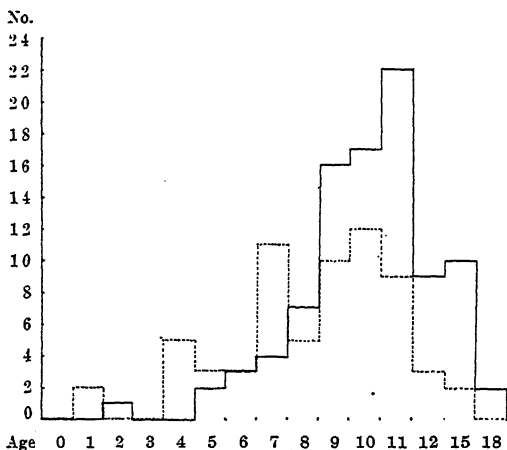
Boys, solid line.
Girls, dotted line.

dependent, there may be boys even younger who already have delinquency records in the juvenile court. The following table gives the diagnosis of the dependent children when classified according to the Binet scale.

TABLE 27.—DIAGNOSIS OF THE DEPENDENT CHILDREN GRADED BY THE
BINET SCALE

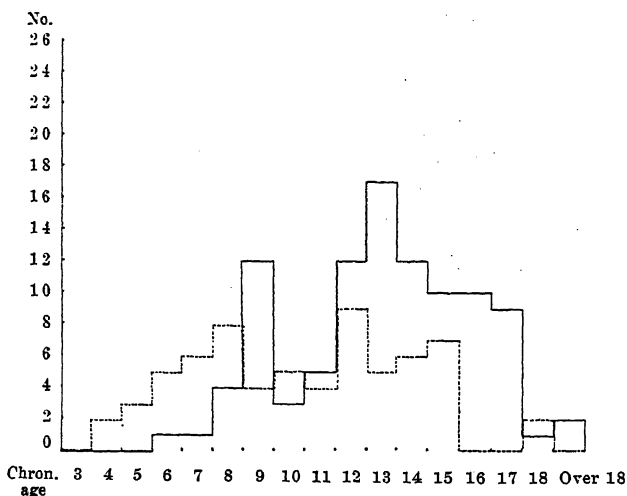
<i>Boys</i>		<i>Girls</i>	
Idiot	1	Idiot	1
Imbecile	0	Imbecile	6
Moron	13	Moron	13
Defective	4	Defective	1
Backward	21	Backward	27
Normal	26	Normal	19
‡	1		—
	—	Total	67
Total	66		

Delinquent and dependent children compared.—By means of graphs 10 to 13 inclusive, it is easy to compare, with respect to mental and chronological age, the delinquent and the dependent children making up this study. These curves show clearly that as the chronological age increases the number of delinquents increases very rapidly. The number of dependent children over fourteen years of age is comparatively small, whereas the larger number of delinquents are more than fourteen years old. It is known that, to a considerable extent, the delinquents have been recruited from the ranks of the dependents and that in reality many of the delinquents are simply dependents grown older. The group of delinquent children may be subdivided into the two divisions, those who have always been largely dependent on outside aid and those who have come from homes which have been financially independent. Of the two hundred and five delinquent children, sixty-two are also dependent and could be included in the dependency group except for the special fact of their delinquency. The table giving the diagnosis of the dependent children as classified according to the Binet scale shows that for both boys and girls thirty-five, or 26 per cent, are actually feeble-minded, forty-five, or 34 per cent, are normal, and the rest, fifty-three, or 40 per cent, are on the border-line between the normal and the feeble-minded, with a certainty that a considerable number will not develop to adult years in a normal manner. These dependent children form an exceedingly



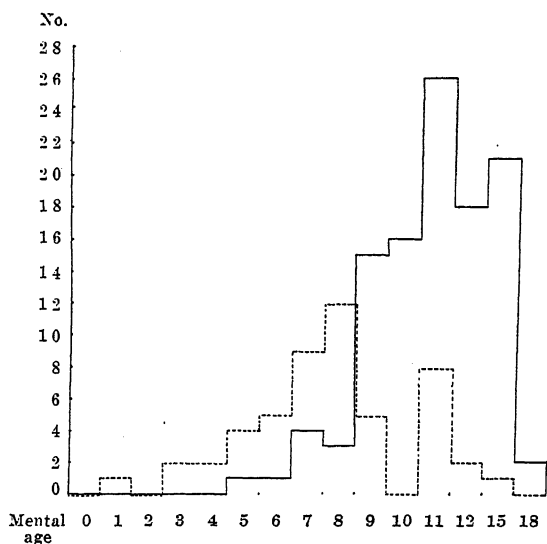
Graph 10. Mental ages of dependent and of delinquent boys.

Delinquent, solid line.
Dependent, dotted line.



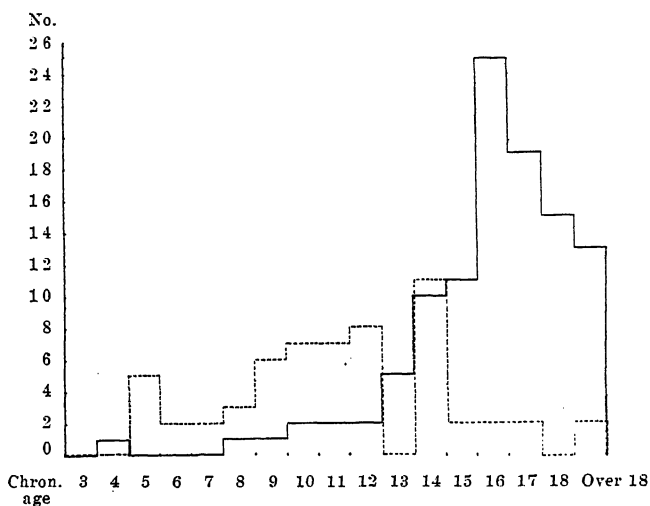
Graph 11. Chronological ages of dependent and of delinquent boys.

Delinquent, solid line.
Dependent, dotted line.



Graph 12. Mental ages of dependent and of delinquent girls.

Delinquent, solid line.
Dependent, dotted line.



Graph 13. Chronological ages of dependent and of delinquent girls.

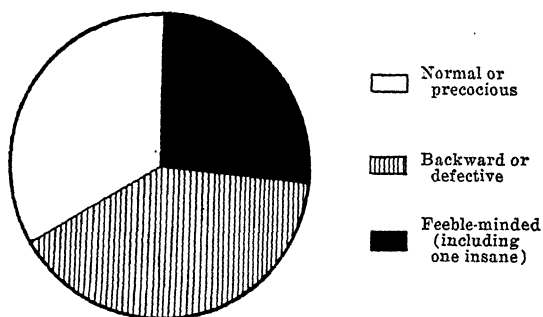
Delinquent, solid line.
Dependent, dotted line.

TABLE 28.—MENTAL STATUS OF DEPENDENT CHILDREN

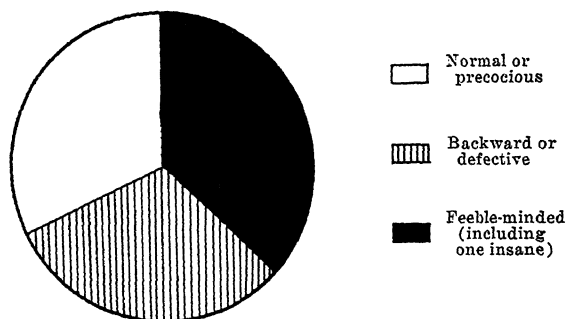
Feeble-minded, including one insane	35	26%
Backward or defective	53	40%
Normal or precocious	45	34%
Total	133	100%

TABLE 29.—MENTAL STATUS OF DELINQUENT CHILDREN

Feeble-minded, including one insane	76	37%
Backward or defective	64	31%
Normal or precocious	65	32%
Total	205	100%



Graph 14. Mental status of dependent children.



Graph 15. Mental status of delinquent children.

important social group. There are many of them at present and their number is not likely to become smaller. The problem of caring for them is a serious one and it is quite obvious that no means should be overlooked for its solution both in the interests of the children and of society. More than half, as the above percentages show, require special care, and a failure to provide this necessary care must be followed by disastrous consequences. None of this particular group has as yet been seriously delinquent, but there is a strong probability that a good many will become delinquent if not cared for in a far-sighted manner. Surely the feeble-minded can never be held morally responsible; and the best policy, and in the end the most economical one, will be to make a close study of this class of children and to provide for them during the rest of their lives, that they may never become more dangerous or unhappy than they are at present.

Parents of dependent children.—The study of the parents of the dependent children is fully as instructive as is that of

TABLE 30.—CLASSIFICATION OF DEPENDENT CHILDREN ACCORDING TO
TYPES OF PARENTS

Both parents inefficient	67
Both parents unknown	18
Father insane, mother inefficient	4
Father inefficient, mother insane	2
Father inefficient, mother neurotic	1
Both parents neurotic	2
Father normal, mother inefficient	3
Mother normal, father inefficient	12
Both parents normal	24
<hr/>	
Total	133

TABLE 31.—CLASSIFICATION OF DEPENDENT CHILDREN, SHOWING
EXTENT OF DEPENDENCY

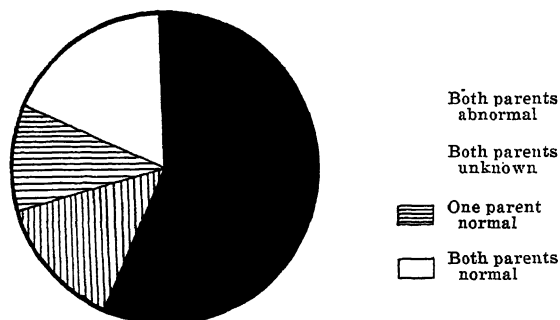
Children in institutions	39
Children from families in constant need of aid	55
Children of widows receiving widows' pension	20
Children in foster-homes	19
<hr/>	
Total	133

TABLE 32.—DEPENDENT CHILDREN WITH NORMAL OR ABNORMAL PARENTS

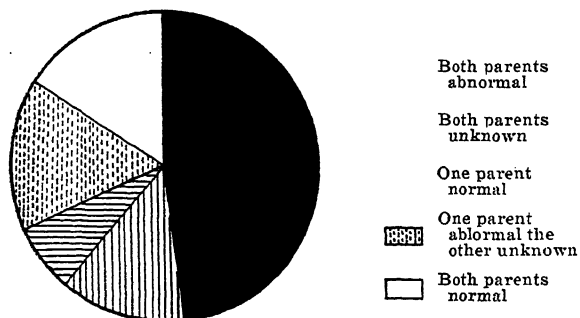
Both parents normal	24	18%
One parent normal	15	11%
Both parents abnormal	76	57%
Both parents unknown	18	14%
Total	133	100%

TABLE 33.—DELINQUENT CHILDREN WITH NORMAL OR ABNORMAL PARENTS

Both parents normal	33	16%
One parent normal	14	7%
Both parents abnormal	99	48%
Both parents unknown	26	13%
One parent abnormal, the other unknown	33	16%
Total	205	100%



Graph 16. Proportion of normal and abnormal parents in the group of dependent children.



Graph 17. Proportions of normal and abnormal parents in the group of delinquent children.

the parents of the delinquents. Results here again tend to show that the two groups of dependents and delinquents are not fundamentally very different. There is in the dependent group a somewhat larger proportion of children having both parents abnormal, but otherwise the tables and graphs are strikingly alike. (See graphs 16 and 17.) The following tables indicate the types of the parents of the dependent children according to the scheme which was used for the delinquents.

Family status of dependents.—Table 34 shows that the father is absent from the home in a much larger number of instances than is the mother. This would of course be expected, since the father is the usual bread-winner and his death or desertion would in most cases at once render the family dependent.

TABLE 34.—FAMILY STATUS OF DEPENDENT CHILDREN, ACCORDING TO PRESENCE OR ABSENCE OF PARENTS

Both parents living and together	29
Both parents dead or unknown	19
Father living, mother dead or unknown	19
Father dead or unknown, mother living	41
Mother at home, deserted by father	13
Father at home, deserted by mother	3
Deserted by both parents	7
Condition of parents unknown	2
Total	133

TABLE 35.—PARENTS NOT LIVING TOGETHER

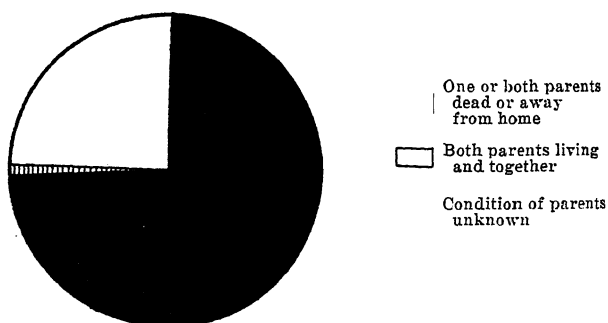
Divorced	5
Separated	18
Total	23

TABLE 36.—FAMILY CONDITION OF DEPENDENT CHILDREN RELATIVE TO THE PRESENCE OR ABSENCE OF PARENTS

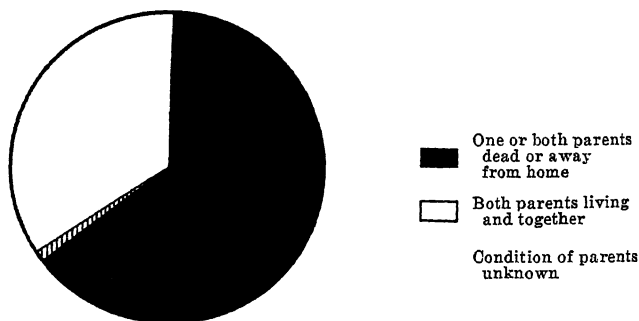
Both parents living and together	29	22%
One or both parents dead or away from home	102	77%
Condition of parents unknown	2	1%
Total	133	100%

TABLE 37.—FAMILY CONDITION OF DELINQUENT CHILDREN RELATIVE TO THE PRESENCE OR ABSENCE OF PARENTS

Both parents living and together	71	35%
One or both parents dead or away from home	131	64%
Condition of parents unknown	3	1%
Total	205	100%



Graph 18. Family condition of dependent children in respect to the presence or absence of one or both parents.



Graph 19. Family condition of delinquent children in respect to the presence or absence of one or both parents.

Employment of parents of dependents.—The occupations of the parents of the dependent children are somewhat less varied than is the case with the delinquents, but their general type is the same. Unskilled occupations and those in which employ-

ment is of necessity irregular predominate. A larger proportion of the fathers of dependents are unskilled day-laborers, but otherwise the two tables might almost be interchanged.

TABLE 38.—OCCUPATIONS OF PARENTS OF DEPENDENT CHILDREN

<i>Father</i>			
Laborer	25	Merchant	1
Sationary engineer	4	Teamster	1
Fruit-peddler	3	Model-maker	1
Carpenter	3	Boiler-washer	1
Ranch hand	2	Seller of lottery tickets	1
Longshoreman	2	Woodcutter	1
Street-lamp lighter	2	Electrician	1
Painter		Sailor	1
Buttonhole maker..		Night watchman	1
Tin-roofer		"Gentleman"	1
Conductor		Printer	1
Builder		Plasterer	1
Shipping clerk		No occupation	1
Paper-hanger		Occupation unknown	67
Stevedore			—
Architect		Total	133
Fireman			

<i>Mother</i>			
Housewife	70	Packing-house hand	
Day-servant	13	Dancing girl	
Factory hand	3	Domestic servant	
Practical nurse	2	Rooming-house keeper	
Laundry-worker	2	Occupation unknown	36
Dressmaker	2		—
Prostitute	2	Total	133

Nativity of parents.—Table 40 shows that Italy again has a number of individuals in the list far in excess of what she should have when the number of foreign-born Italians in San Francisco is taken into consideration. In this list Ireland is second in having many dependents, while Germany, which was second in the delinquency table, is fifth in the dependency list. This indicates that the Germans, at least in San Francisco, have a greater tendency to delinquency than to dependency and that in respect to delinquency they are far less desirable immigrants than in

respect to dependency. It must always be borne in mind, however, that the numbers which are being considered here are so small that the indications are not conclusive.

TABLE 39.—NATIVITY OF DEPENDENT CHILDREN

Native-born of native-born parents	34
Native-born of mixed parentage	8
Native-born of foreign-born parents	44
Foreign-born of foreign-born parents	13
Nativity unknown	34
Total	133

TABLE 40.—NATIVE COUNTRY OF FOREIGN-BORN PARENTS

Italy	26
Ireland	23
Spain	19
France	14
Germany	6
Porto Rico	6
Chile	4
Scotland	4
Hawaii	4
Mexico	4
Russia	2
England	2
Sweden	2
Norway	2
Portugal	2
Belgium	1
Finland	1
Total	122

Environment of dependent children.—The table showing the environment of the dependent children, based on the same scheme as was used in the case of the delinquents, shows again a marked resemblance between the delinquent and the dependent children. Most of the dependent children come from bad or unsatisfactory homes, but a somewhat larger proportion comes from good homes—namely, 34 per cent of the dependents, as against 23 per cent

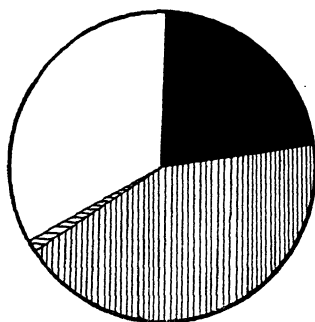
of the delinquents. In this connection the group of delinquents who are also dependent has been considered separately, and of this group almost none come from good homes, merely 3 per cent of the total.

TABLE 41.—ENVIRONMENT OF DEPENDENTS

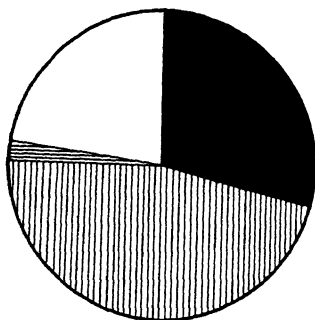
Environment good	45	34%
Environment bad	29	22%
Environment unsatisfactory	58	43%
Environment unknown	1	1%
<hr/>		
Total	133	100%

TABLE 42.—ENVIRONMENT OF DEPENDENT-DELINQUENTS

Environment good	2	3%
Environment bad	27	44%
Environment unsatisfactory	33	53%
<hr/>		
Total	62	100%

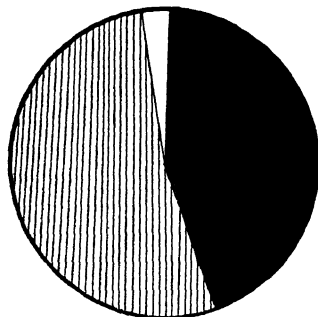


Dependents.



Delinquents.

Bad environ-
ment
Unsatisfactory
environment
Environment
unknown
Good environ-
ment



Dependent delinquents.

Graphs 20, 21 and 22. Environmental conditions of various groups of children.

NOTES ON GROUP OF MISCELLANEOUS CASES

This last group consists of children coming to the clinic, who for some reason seemed to be abnormal. They are interesting only as individuals or as examples of the types of children that are brought to a psychological clinic for some apparent abnormality. There were one hundred and twelve of these children. When graded according to the Binet scale, the results shown in table 43 were obtained. Those children, ranking

TABLE 43.—DIAGNOSES OF CASES ACCORDING TO THE BINET SCALE

Idiot	7
Imbecile	15
Moron	14
Defective	2
Backward	31
Normal	42
? (Insane)	1
<hr/>	
Total	112

according to the Binet scale as normal or approximately normal in respect to general intelligence, present a number of interesting mental, physical and neurological abnormalities. They are briefly summarized in table 44.

TABLE 44.—CHILDREN GRADED AS NORMAL BY THE BINET SCALE

Normal in every respect	7
Neurotic and mentally unstable	13
Epileptic	8
Given to violent fits of temper	3
Suffering from adenoids	3
Congenitally deaf	2
Unable to learn to spell	1
Choreic	1
Ill with pulmonary tuberculosis	1
Suffering from defective vision	1
Lazy and inefficient	1
Paralytic	1
<hr/>	
Total	42

TABLE 45.—CHRONOLOGICAL AGES OF THE MISCELLANEOUS GROUP

<i>Boys</i>		<i>Girls</i>	
1 yr.....	1	3 yrs.....	2
3 yrs.....	2	4 ".....	3
4 ".....	4	5 ".....	2
5 ".....	5	6 ".....	3
6 ".....	8	7 ".....	5
7 ".....	4	8 ".....	1
8 ".....	4	9 ".....	3
9 ".....	5	10 ".....	3
10 ".....	6	11 ".....	2
11 ".....	4	12 ".....	1
12 ".....	1	13 ".....	4
13 ".....	5	14 ".....	1
14 ".....	5	15 ".....	5
15 ".....	1	16 ".....	3
16 ".....	2	17 ".....	2
17 ".....	2	18 ".....	1
23 ".....	1	19 ".....	1
30 ".....	1	22 ".....	1
		28 ".....	1
Total	65	36 ".....	1
		Total	47

TABLE 46.—MENTAL AGES OF THE MISCELLANEOUS GROUP

<i>Boys</i>		<i>Girls</i>	
1 yr.....	3	1 yr.....	2
2 yrs.....	5	2 yrs.....	2
3 ".....	3	3 ".....	1
4 ".....	5	4 ".....	2
5 ".....	5	5 ".....	4
6 ".....	7	6 ".....	7
7 ".....	5	7 ".....	3
8 ".....	6	8 ".....	7
9 ".....	4	9 ".....	2
10 ".....	6	10 ".....	4
11 ".....	10	11 ".....	8
12 ".....	2	12 ".....	2
15 ".....	2	15 ".....	2
?	2	?	1
Total	65	Total	47

Among the backward and feeble-minded children in this miscellaneous class there were to be found nearly as many types as in the so-called normal group. Among them were two epileptics, four paralytics, four Mongolian idiots, one hydrocephalic, two cretins, besides a number of children who were constitutionally psychopathic. This whole group has been a most interesting one because of the number of rather unusual mental and nervous disorders which have been brought to the attention of the examiners. These children were brought in usually by their own parents; they came as a rule from fairly good homes, and because of the natural reticence on the part of the parents the study of the social background was not at all satisfactory. As individual cases, however, they have helped to make the work in the clinic rich in special opportunities for studying mental and physical abnormality.

GENERAL CONCLUSION

As has been shown in the preceding pages, of the delinquent children included in this study, 36 per cent may be considered definitely feeble-minded, 32 per cent backward or with a defect less than actual feeble-mindedness, and 32 per cent normal so far as general intelligence is concerned. In the group of dependents, 26 per cent may be regarded as feeble minded, 39 per cent as backward or defective, and 34 per cent as normal. The fact that the ages of the two groups, delinquents and dependents, differ materially, may account, to a very large extent, for the differences in the percentages of defect in the two classes. As the younger backward children grow older, many will unquestionably continue to lag in their development and later will go to make up a larger group of feeble-minded children.

Considerable work has been done by other persons with delinquent children, but there are no adequate statistics available as to the mental status of dependents as a class. It has been estimated that 50 per cent of the inmates of almshouses are feeble-minded, but this is based on more or less superficial and untrained observation, and cannot be accepted as conclusive. Much more reliable figures are to be had as to the mental status of offenders, both juvenile and adult, but even in these there is considerable variance. Dr. Goddard concludes that probably 25 per cent to 50 per cent of the people in prisons are mentally defective, and that 50 per cent of prostitutes are feeble minded. These conclusions he bases on the reports of tests made on individuals in reformatory institutions, the results of which are shown in table 47 taken from his recent publication.⁴

The report of the Massachusetts "Commission for the Investigation of the White Slave Traffic, So-called," gives the results obtained from testing a group of three hundred prostitutes by

⁴ Goddard, H. H., *Feeble-mindedness: its causes and consequences*, New York, Macmillan, 1914, p. 9.

TABLE 47.—DEFECTIVES IN REFORMATORY INSTITUTIONS

Institution	Percentage Defective
St. Cloud, Minnesota, Reformatory	54
Rahway Reformatory (New Jersey) (Binet)	46
Bedford Reformatory, New York (under 11 years)	80
Lancaster, Massachusetts (Girls' Reformatory)	60
Lancaster, Massachusetts (50 paroled girls)	82
Lyman School for Boys, Westborough, Massachusetts	28
Pentonville, Illinois, Juveniles	40
Massachusetts Reformatory, Concord	52
Newark, New Jersey, Juvenile Court	66
Elmira Reformatory	70
Geneva, Illinois (Binet)	89
Ohio Boys' School (Binet)	70
Ohio Girls' School (Binet)	70
Virginia, three reformatories (Binet)	79
New Jersey State Home for Girls	75
Glen Mills Schools, Pennsylvania, Girls' Dept., about	72

the Binet scale. Of the total three hundred cases, one hundred and fifty-four, or 51 per cent, were unquestionably feeble-minded. This estimate is very conservative, for all doubtful cases were called normal, and it was recognized by the examiners that of the one hundred and thirty-five called normal "not more than six of the entire group seemed to have really good minds." The report further states that at the Massachusetts school for the feeble-minded "are an equal number of women and girls, medically and legally certified as feeble-minded, who are of equal or superior mental capacity" to the above-mentioned one hundred and thirty-five cases classed as normal.

The report of the work of the Morals Court in Chicago gives the estimate that 50 per cent of women prostitutes are mentally defective, this conclusion being based on an investigation of the school grades attained by the women.

W. H. Pyle⁵ studied two hundred and forty delinquent girls in the State Industrial Home for Girls, in Chillicothe, Missouri. He made use of groups of tests for invention, free association,

⁵ Pyle, W. H., A study of delinquent girls, *Psychological Clinic*, VIII, 143-149, October, 1914.

memory and imagination, and concluded that two-thirds of the girls were subnormal, probably high-grade morons. He did not use the Binet tests, because of lack of time for the individual tests.

Miss Margaret Otis, resident psychologist in the State Home for Girls in Trenton, New Jersey,⁶ has reported the results of her examinations of one hundred and seventy-two of the girls in this institution and finds only 25 per cent "presumably normal." The remaining 75 per cent are "Defective," 30 per cent being "Morons."

Dr. William Healy, of the Chicago Juvenile Psychopathic Institute,⁷ has examined one thousand young recidivists, by means of a group of tests devised by himself and Dr. Grace Fernald, and concludes that "about 10 per cent" of this group of cases are "beyond peradventure feeble-minded" and that 67.4 are cases "that should be regarded without question as mentally normal." Although Healy finds a much larger proportion of his young offenders normal than do most observers, still he concludes that "mental defect forms the largest single cause of delinquency to be found by correlating tendency to offend with characteristics of the offender."

Miss Emile Renz, of Columbus, Ohio,⁸ has made a careful study of one hundred consecutive admissions to the Ohio Girls' Industrial Home, all of the inmates of which had been committed by the court with the statement that the intellect was sound, with the concession made in two cases, "but not apt." Of these one hundred girls, 79 per cent show more than three years' retardation. Two of them pass the twelve-year tests and therefore pass into the lowest stratum of normals, leaving 77 per cent feeble-minded, according to the Binet classification. Three years' retardation is coming to be considered too little on which

⁶ Otis, Margaret, Binet tests applied to delinquent girls, *Psychological Clinic*, vii, 127-135, October, 1913.

⁷ Healy, William, *The individual delinquent*. Boston, Little, 1915, pp. 140, 447.

⁸ Renz, Emile, A study of the intelligence of delinquents and the eugenic significance of mental defect, *Training School Bulletin*, xi, 37-40, May, 1914.

to make the diagnosis of feeble-mindedness, and if a retardation of four years is required, the number of feeble-minded in the one hundred cases drops to 58 per cent. Miss Renz considers that 58 per cent "represents the moderate statement, and a trustworthy figure for theoretic purposes."

George S. Addams, Judge of the Juvenile Court of Cleveland, Ohio,⁹ in a report to the National Conference of Charities and Corrections, makes a strong plea for mental examinations of children in the courts, emphasizing the importance of mental deficiency in the causation of vice and crime. He states that of one hundred consecutive commitments to the Boys' Industrial School of Ohio, only seventeen were found normal, the balance being border-line, backward or defective.

H. B. Hickman of the Indiana Boys' School¹⁰ tested two hundred and twenty-nine boys in that institution by the Binet scale and concluded that of the whole number "only about sixty-three will be able to get out and take anything like a normal station in society, at least forty-five will always be unfit for anything except institution life, and the remainder will always require assistance of some kind toward making their living."

The George Junior Republic, in Freeville, New York, has also had to face the problem of mental deficiency in the case of some of its 'citizens.' The fact that a few of these children had failed to benefit as they should have done by the methods of the Republic, led the Educational Department of Cornell University to carry out, at the request of the Republic, tests of mental status on the more troublesome cases. As a result, a series of clinics was held and twenty-six of the 'citizens,' twenty boys and six girls, were tested according to Goddard's revision of the 1911 Binet-Simon tests.¹¹ Of the six girls, two were

⁹ Addams, Geo. S., Defectives in the juvenile court, *Training School Bulletin*, xi, 49-55, June, 1914.

¹⁰ Hickman, H. B., Delinquent and criminal boys tested by the Binet scale, *Training School Bulletin*, xi, 159-165, January, 1915.

¹¹ Jennings, H. M., and Hallock, A. L., Binet-Simon tests at the George Junior Republic, *Jour. Educ. Psychol.*, iv, 471-475, October, 1913.

definitely defective and two probably defective. It was concluded that the first two should be removed from the Republic and the second two should be re-tested later for signs of improvement. Of the twenty boys tested, three were graded as morons and their removal from the Republic was advised. The next four were border-line cases, needing further study; the remaining thirteen were normal. The examiners have concluded that "the tests have served a real purpose in the practical administration of the Freeville Republic, and it is planned that in the future no applicants for admission to citizenship will be received until their mental status has been scientifically determined."

All the evidence points to the same conclusion: that a large proportion of delinquents are defective, and that the mental deficiency has undoubtedly exercised a large influence in the causation of their delinquency. An important next step includes careful study of delinquents wherever they are found, and beyond this a study of the school population in order to determine as nearly as possible which of the school children will be clearly incapable of developing normally, and to make adequate plans for them before they become delinquent. If this is to be done successfully, the whole class of dependents must also be carefully studied and permanent plans must be made for them, so that, when they arrive at an age when state laws no longer provide for their maintenance, any who need special care or supervision can be provided for permanently. Measures looking toward this end will prevent many dependent children from becoming delinquent as soon as the rather unusual supervision exercised over them by the state, either in institutions or in boarding-homes or under the provisions of the Widows' Pension Law, has been removed.

APPENDIX

SUMMARY OF TYPICAL CASE-HISTORIES

Case 29.—M. J. was referred to the Psychological Clinic by the maternity ward of the University Hospital, because she seemed defective. It was said of her that she used such bad language that she could not be allowed to remain in the ward with the other patients. She was an unmarried woman of thirty-two years and had an infant a few weeks old. This woman's parents had died when she was about seven years old and she was placed in an orphanage. There she remained until she was fifteen years old, when work was found for her in a private home as a domestic servant and she was discharged from the institution. In less than a year's time she gave birth to an illegitimate child, which had a hare-lip and died when three days old. From that time till about a year ago she supported herself by doing housework. Under supervision she works very well, but morally she is entirely irresponsible. According to the Binet scale she has a mental age of nine years and is distinctly feeble-minded. All other tests show her equally defective. She has already had two illegitimate children and if left at large, will almost certainly have more. She is assuredly a person who needs care and protection such as could be given her in the proper institution; society should find means of protecting itself against such individuals.

Case 32.—C. G. is a fourteen-year-old girl sent to the Psychological Clinic by the Associated Charities of San Francisco. The father is unknown and the mother is alcoholic and immoral. The mother has also been considered mentally defective. For six years C. G. has been in a foster-home where she has received good care and training. She is now in the second grade in school and is clearly a defective child. She occasionally has epileptic convulsions. According to the Binet scale she has

a mental age of eight years and will never be a normal person. She will never be able to support herself without a very large measure of supervision and should certainly not be thrown upon her own responsibilities at any time. Steps should be taken to place her in an institution for the feeble-minded before it becomes necessary to release her from the care of the Children's Agency of the Associated Charities of San Francisco. There she would learn to do simple, routine work, and would be protected during the rest of her life from the dangers to which she would be exposed if left at large.

Case 39.—C. M. is a fourteen-year-old boy sent to the clinic by the Associated Charities. Three years ago he was taken from his parents, both of whom were known to be immoral, and committed to the Children's Agency. He was at that time in an exceedingly bad physical condition as the result of hereditary syphilis, and it was necessary to keep him in a hospital for two years, receiving appropriate treatment, before it was considered safe to place him in a foster-home. For the past year he has been in a good home and has improved greatly both mentally and physically. According to the Binet scale he has a mental age of nine years with a retardation of five years. He is now in the third grade in school. Until a year ago this boy had never attended school. In spite of his great physical handicap his progress has been gratifying, and, although he is still far from normal, some further improvement is to be expected.

Cases 40, 65, 91 and 92.—These four children were brought to the clinic from one of the orphanages of San Francisco. N. D. and N. S. are brother and sister, as are J. J. and J. S. They all have the same maternal grandmother. The parents of N. D. and N. S. were both drunkards, and the mother died of pulmonary tuberculosis. N. D., an eight-year-old epileptic girl, is entirely irresponsible and unable to fix her attention on any mental work long enough to do schoolwork successfully. S. N., her brother, is an eleven-year-old boy apparently normal in every way. He is in the sixth grade in the

public school, is bright and energetic, and has good native ability. He has a mental age of nearly twelve years, and seems to have no abnormal tendencies of any kind.

The father of J. J. and J. S. was a drunkard, probably mentally defective, and was thought to have murdered his own mother, though this crime was never proven against him. The mother of these two children was very eccentric. She is now dead. J. J. is a fourteen-year-old girl with a mental age of ten years. She is in the sixth grade in the public school and is quiet and obedient, though it is recognized by nearly all with whom she comes in contact that she is below normal. Her brother, J. S., is thirteen years old with a mental age of nine years. He is only in the third grade and is regarded as markedly defective. These four children of one grandmother, who was known to be exceedingly peculiar, show well the effect of bad heredity. It is not possible to say, out of all the factors which make the heredity so bad, which are the most important. Only one of the four children is normal, one is epileptic, and two are mentally defective.

Case 103. P. C. is a nine-year-old boy brought to the Juvenile Court by his mother because he had tried to poison his little sister. He had poured off the liquid from poison flypaper and had given it to the child to drink. He said that he had read in the paper that it would kill, and that he had wanted to see what she looked like while she was dying. His mother found him trying to give the baby the poisoned water, and so averted the catastrophe. He ordinarily seemed rather fond of his sister and frequently played with her. His mother says, however, that he is not affectionate and does not care much for anyone. He is small for his age and very quick and bright. According to the Binet scale he has a mental age of eleven years, ranking two years above normal. He has remarkable mechanical ability and is very fond of machinery of all kinds. The home seems good in every way and the parents normal. This last act on the part of the boy, however, has filled the mother with apprehen-

sion and she is distinctly afraid of what he may do in the future. He is above the average in intelligence and in ingenuity, and if handled wisely may develop remarkably. This is one of the rare cases in which a precocious child with marked ability is so devoid of natural feeling as to make him an actual menace to those about him.

Case 122.—G. M. is a fourteen year old girl brought to the Juvenile Court for repeated immorality. She comes from a good home; both parents are normal so far as can be judged. For the past two years she has been running away from home again and again, and is a source of constant and deep concern to her parents. They have done everything in their power to give her normal and varied interests, but cannot influence her in any way. She has had music lessons and has been placed in a gymnasium, but nothing attracts her. Recently she has grown morose and sullen and seems to have no affection for other members of her family. She is in the seventh grade in school, and has always seemed as bright as the average girl of her age. According to the Binet scale she has a mental age of over twelve years, ranking as normal. The great trouble with this girl seems to be her persistent immorality, which she cannot explain. She simply says she cannot help it. Whether she is to be dominated all her life by these abnormal impulses, it is impossible to say, but at the present time she should be placed in some institution where she can be observed and where she can be protected from herself.

Case 115.—T. J. is a six year old boy, who was brought to the clinic by his school teacher for stealing and untruthfulness. It was reported that he stole everything he could lay hands on, and could never be relied on to tell the truth about anything. There are four children in the family, this lad being the oldest of the four. The father is a drunkard and has never provided for the needs of the family in a satisfactory way. About two years ago he deserted the mother with her four small children and has not been heard of since. The mother worked for a

time as a telephone operator and with the aid of relatives managed to look after the children. Her lot was a hard one, however, and her responsibilities apparently were too much for her, for less than a year ago she, too, disappeared leaving the children with their grandmother. Since then the whole family has been cared for to a considerable extent by the Associated Charities, for the grandmother is not financially able to look after them. All have lacked moral training and are entirely undisciplined. This boy seems to have developed no moral sense and to him there is no "mine and thine." He has a mental age of seven years according to the Binet scale and has good native ability in all directions. He is affectionate and attractive, though very selfish. In general intelligence he seems rather above the average child of his age. The boy's greatest trouble seems to be a moral deficiency due very largely to lack of moral training. He needs the most careful education along moral and mental lines, if he is to develop in a normal way. It is probable, if he is neglected, that the dangerous tendencies which he now shows will become more marked and make further trouble.

Cases 190, 289 and 366. G. M., F. J. and F. E. are three sisters referred to the clinic through different agencies. The mother is dead and the father is a cook on a river-boat. He is alcoholic and irresponsible and for some time has failed to support his family. All three of the girls are seriously immoral and seem to have the lowest social standards. G. M., who is twenty-three years old, has a mental age of nine years; F. J., who is nineteen years old, has a mental age of ten years; F. E., aged seventeen years, has a mental age of twelve years. Two of these girls, then, are definitely feeble-minded and the third defective but not actually feeble-minded. The two younger girls are under the care of the Juvenile Court, but the oldest is married and already has two children. She is almost entirely dependent on public aid for her living, and her youngest child has a serious disease of the eyes which will probably result in at least partial blindness. This woman's husband has deserted her and she is living with a man to whom she is not married.

UNIVERSITY OF CALIFORNIA PUBLICATIONS
IN
PSYCHOLOGY

Vol. 3, No. 2, pp. 61-72, plates 1-3

January 30, 1919

ANALYSIS OF PACKAGE LABELS

BY
WALTER S. HELLER

UNIVERSITY OF CALIFORNIA PRESS
BERKELEY

UNIVERSITY OF CALIFORNIA PUBLICATIONS

Note.—The University of California Publications are offered in exchange for the publications of learned societies and institutions, universities and libraries. Complete lists of all the publications of the University will be sent upon request. For sample copies lists of publications or other information, address the Manager of the University Press, Berkeley, California, U. S. A. All matter sent in exchange should be addressed to The Exchange Department, University of California Library, Berkeley, California, U. S. A.

PSYCHOLOGY.—George M. Stratton, Editor. Price per volume \$3.50.

Cited as Univ. Calif. Publ. Psychol.

Vol. 1.	1. The Judgment of Difference, with Special Reference to the Doctrine of the Threshold, in the Case of Lifted Weights, by Warner Brown. Pp. 1-71, 4 text figures. September, 1910	\$0.50
	2. The Process of Abstraction, an Experimental Study, by Thomas Verner Moore. Pp. 73-197, 6 text figures. November, 1910	1.00
	3. The Judgment of Very Weak Sensory Stimuli, with Special Reference to the Absolute Threshold of Sensation for Common Salt, by Warner Brown. Pp. 199-268, plates 1-4. February, 1914 .....	.60
	4. Habit Interference in Sorting Cards, by Warner Brown. Pp. 269-321. April, 1914 .....	.50
	5. Diurnal Variations in Memory and Association, by Arthur I. Gates. Pp. 323-344. March, 1916 .....	.20
	6. Correlations and Sex Differences in Memory and Substitution, by Arthur I. Gates. Pp. 345-350. May, 1916 .....	.06
Vol. 2.	1. Variations in Efficiency During the Day, Together with Practice Effects, Sex Differences, and Correlations, by Arthur I. Gates. Pp. 1-156. March, 1916	1.50
	2. Experiments on Attention and Memory, with Special Reference to the Psychology of Advertising, by J. M. Levy. Pp. 157-197. March, 1916 .....	.40
	3. The Psychology and Physiology of Mirror-writing, by Justin K. Fuller. Pp. 199-265. May, 1916 .....	.70
	4. Memory and Association in the Case of Street-car Advertising Cards, by Walter S. Heller and Warner Brown. Pp. 267-275. May, 1916 ....	.10
	5. A Comparison of the Japanese Folk-Song and the Occidental: A Study in the Psychology of Form, by Sangoro Ito. Pp. 277-290. May, 1916 ....	.15
	6. Individual and Sex Differences in Suggestibility, by Warner Brown. Pp. 291-430. July, 1916	1.50
Vol. 3.	1. An Experimental Study of Abnormal Children, with Special Reference to the Problems of Dependency and Delinquency, by Olga Bridgman. Pp. 1-59. March, 1918 .....	.65
	2. Analysis of Package Labels, by Walter S. Heller. Pp. 61-72, plates 1-3. January, 1919 .....	.15

PHILOSOPHY.—George H. Howison, Editor. Price per volume \$2.00.

Cited as Univ. Calif. Publ. Philos.

The first volume of the University of California Publications in Philosophy appeared in November, 1904, and was prepared in commemoration of the seventieth birthday of Professor George Holmes Howison, under the direction of a committee of his pupils composed of Evander Bradley McGilvary, Charles Henry Rieher, Harry Allen Overstreet and Charles Montague Bakewell. The price of the volume is \$2. It may be had bound, or the papers may be obtained separately. Its contents are:

Vol. 1.	1. The Summum Bonum, by Evander Bradley McGilvary. Pp. 1-27 .....	.25
	2. The Essentials of Human Faculty, by Sidney Edward Mezes. Pp. 28-55 .....	.25
	3. Some Scientific Apologies for Evil, by George Malcolm Stratton. Pp. 56-71 .....	.15
	4. Pragmatism and the <i>a priori</i> , by Charles Henry Rieher. Pp. 72-91 .....	.20
	5. Latter-day Flowing-Philosophy, by Charles Montague Bakewell. Pp. 92-114 .....	.20
	6. Some Problems in Evolution and Education, by Ernest Norton Henderson. Pp. 115-124 .....	.10
	7. Philosophy and Science in the Study of Education, by Jesse Dismukes Burks. Pp. 125-140 .....	.15
	8. The Dialectic of Bruno and Spinoza, by Arthur Oncken Lovejoy. Pp. 141-174 .....	.25
	9. The Logic of Self-Realization, by Henry Waldgrave Stuart. Pp. 175-205 .....	.30

ANALYSIS OF PACKAGE LABELS

BY

WALTER S. HELLER

INTRODUCTION

The object of this investigation was to ascertain what influence the label on a package has on a purchaser, and if possible to determine whether there is any logical relation between the quality of the contents and the wrapper. In an earlier experiment conducted by the writer, a group of subjects arranged according to choice twelve packages of brown laundry soap. They were permitted to use any basis of judgment they pleased, simply being informed that the price per cake was uniform. This arrangement was later compared with arrangements of the same soap in blank wrappers and later without any wrappers at all. The results showed that there is rather a high correlation between the various arrangements, and on analysis it was found that the two most important factors were: (1) *familiarity*, and (2) *size and shape*. The first of these was important in the case of three or four of the twelve brands, while the second determined the choice in all the other nine and to some extent with the three familiar brands. It was finally decided that if *size and shape* could be controlled and *familiarity* minimized, the results would show what influence was exerted by the labels. The endeavor to eliminate these factors led to the investigations herein reported.

The material consisted of twelve brands of canned "yellow cling" peaches put up in two and one-half pound tins (pls. 1-3).

They were all the same size, all bore the name of the California Fruit Cannery Association, and different only in brand and make-up of label. Peach labels were selected on account of the great variety obtainable. The twelve selected brands were distributed among five qualities as follows:

Quality 1	Special Extra	1 brand
Quality 2	Extra	1 brands
Quality 3	Extra Standard	1 brands
Quality 4	Standard	1 brands
Quality 5	Seconds	2 brands
Total		12 brands

As there was only one brand obtainable of the first quality, there was no choice. In the case of qualities 2, 3, and 4 from which there was considerable selection, the choice was made by taking what appeared to be the best one, a medium one, and a poor one. From quality 5, one was chosen which seemed to be the best, and one other which seemed to be the worst.

The subjects for the experiment were shown the twelve cans, bearing their labels, and asked to make an arrangement according to preference. The cans were placed on a shelf a little above the level of the eye, in the endeavor to maintain store conditions. The same subjects were also to arrange the contents of the cans. For this purpose the peaches and juice were placed in saucers. There were twelve saucers, one for each brand. The subjects were to arrange these merely by appearance; they were not permitted to taste the contents.

PART I

The persons selected for observers in this experiment were fifty men and fifty women, most of them untrained subjects, having no knowledge of the experiments other than what was conveyed in the written directions.

Sheets containing the following questions were handed to them for preliminary information:

1. What experience, if any, have you had in purchasing canned peaches?
2. Make a list below, of as many brands of canned peaches as possible.

The results showed that 34 per cent of the men and 28 per cent of the women had previous experience in purchasing canned peaches. Ninety per cent of the subjects mentioned one of our brands, Del Monte. Practically none mentioned any of the others.

On completion of the preliminary test, the subject was given the following set of directions:

The experiment in which you have been called to take part is on the psychology of the package, wrapper and container.

You will be shown twelve (12) brands of "Yellow Cling Peaches" under two conditions. In one condition the fruit in cans will be shown and in the other the fruit open. In both cases you are to arrange them from left to right, beginning with the first choice.

A memory test was made as soon as the arrangements were completed, the directions for which were as follows:

1. Write down the names of all the peaches you can remember of the series just shown you. Enter the item under one of the two heads, according to what you remember.

(a) Brand.

(b) Special feature (any feature of label you remember).

2. Which of these peaches shown, have you heard of before?

3. In the case of arranging the cans, what was the basis of your judgment?

Considering the fruit in the saucers, the arrangement according to position value* is as follows:

	Men	Women	Men and women
Quality 1	3.26	2.60	2.93
Quality 2	5.86	5.37	5.61
Quality 3	5.77	5.91	5.84
Quality 4	6.26	7.04	6.65
Quality 5	10.54	10.23	10.39

The results show that there is a very marked difference in appearance between the various qualities, and that the observers,

* By position value is meant the average position given by the group of subjects. If the choice were arbitrary, each would have a value of six and one-half, but as there is of course a choice, the position held by any one label might range from one up to twelve. The average position of any label will be near one or near twelve only in case the subjects agree very closely with one another.

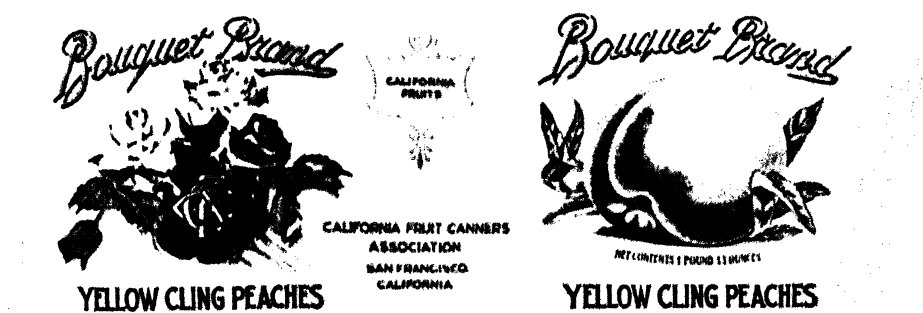
unfamiliar as they were with the material, could not be deceived, which as we shall later see, was not the case with the labels. The position values show that there is a greater difference between qualities 1 and 2 and between 4 and 5 than between qualities 2, 3 and 4. There are no noticeable sex differences.

The following table shows the arrangement of the cans when they were arranged according to their labels:

uality	Name of brand	Men	Women	Men and Women	Memory Men and women
1	Griffon	5.90	6.52	6.21	26.5%
2	Del Monte	2.78	1.92	2.35	75.5%
2	Aeme	6.00	5.42	5.71	47.2%
2	Oak	7.92	7.78	7.85	51.5%
3	Mission	4.10	4.48	4.29	62.5%
3	Gold Seal	4.88	4.56	4.72	31.2%
3	Sweet Brier	6.44	7.10	6.77	40.5%
4	Banquet	7.38	8.78	8.08	65.5%
4	Swallow	7.84	8.38	8.11	47.0%
4	Bouquet	8.32	8.58	8.45	33.0%
5	Ideal	6.06	3.88	4.97	42.0%
5	Creole	10.32	10.66	10.49	65.7%

The correlation of this arrangement (men and women combined), with the actual qualities is 0.48, showing that there is some relationship between the label and the contents; however, the subjects were far less correct in their judgment of the labels than in their judgment of the fruit itself. The analysis of this table shows that Del Monte comes first, probably because of its familiarity. The only important sex difference shows itself in the case of Ideal, which is ranked second by the women and sixth by the men. The range of position value of the women is a little greater than that of the men, showing that the former are more alike or positive in their selection. On the whole men and women correlate so highly that the figures can be combined without detriment to the final results.

The memory test was given to the observer after the completion of the arrangements just referred to. The subjects were asked to enter what they remembered under two headings: (A) Name of brand—being explicit information; (B) Special feature remembered—being general information. If under either head-



ing the information was partly correct, only half credit was given. The data have been combined into a single unit by taking the sum of the information, i.e., $A + B + \frac{A}{2} + \frac{B}{2}$, and expressing it in per cent.

The results show that the observer well remembers his first choice and also clearly remembers the very bad labels at the end of the list.

In answer to the second question on the memory blank, "Which of these peaches shown have you heard of before?" Del Monte receives over 50 per cent more responses than all the others combined.

In reply to the third question, "In the case of arranging the cans, what was the basis of your judgment?" a great many factors or incentives are named, many of which are too complicated for analysis in such a study as this, but the following factors were frequently noted.

1. Familiarity
2. Color scheme
3. Simplicity
4. Richness
5. Appropriateness
6. Pleasingness.

It appeared that if these factors could be separately controlled, different arrangements might result.

PART II

This part of the experiment deals with the arrangement of the labels used in Part I according to five explicit sets of directions, each one containing one of the incentives, with the exception of *familiarity*, referred to at the end of the last paragraph. Each set was arranged by thirty-seven women subjects, no one subject making more than one arrangement. Some of the subjects, however, had previously made the *uncontrolled* arrangement; these were warned that the directions differed from the first by calling for a definite arrangement.

The five sets of directions were as follows:

1

Arrange the twelve cans of peaches from left to right beginning with your first choice on the left according to *color scheme*.

Place the one with the most effective color scheme on the extreme left, then the next most effective, and so on down to the one with the least effective color scheme.

2

Arrange the twelve cans of peaches from left to right beginning with your first choice on the left according to the *simplicity* of the label.

Place the one with the most simple label on the extreme left, then the next most simple, and so on down to the least simple.

3

Arrange the twelve cans of peaches from left to right beginning with your first choice on the left according to the *richness* of the label.

Place the richest on the extreme left, then the next most rich, and so on down to the least rich.

4

Arrange the twelve cans of peaches from left to right beginning with your first choice on the left according to the *appropriateness* of the label.

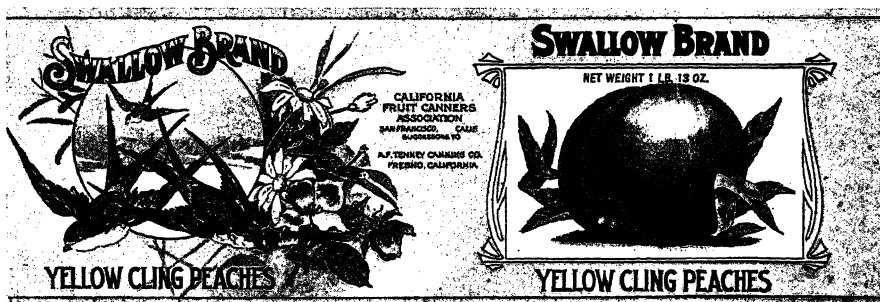
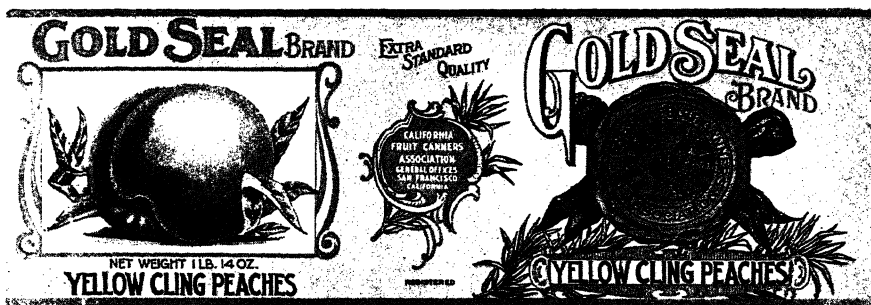
Place the one with the most appropriate label on the extreme left, then the next most appropriate, and so on down to the least appropriate.

Arrange the twelve cans of peaches from left to right beginning with your first choice on the left according to the *pleasingness* of the label as a whole, including design or picture, typographical arrangement and balance.

Place the most pleasing one on the extreme left, then the next most pleasing, and so on down to the least pleasing.

The position value for the different arrangements under the various captions is as follows:

	1 Uncontrolled judgment	2 Color	3 Richness	4 Pleasing- ness	5 Simplicity	6 Appropri- ateness
Del Monte	2.35	3.32	3.51	3.67	3.27	4.51
Mission	4.29	5.43	4.54	3.81	6.00	5.40
Gold Seal	4.72	5.81	3.97	5.13	6.30	5.05
Ideal	4.97	5.45	5.72	4.86	1.48	5.32
Acme	5.71	5.02	6.06	5.75	2.35	6.00
Griffon	6.21	7.70	4.87	6.64	6.37	6.86
Sweet Brier	6.77	5.75	6.93	6.08	7.10	6.27
Oak	7.65	6.94	7.09	5.43	6.37	7.10
Banquet	8.08	8.64	8.60	10.43	11.37	6.46
Swallow	8.11	6.81	8.18	6.21	10.27	7.67
Bouquet	8.45	8.02	8.21	8.62	9.30	7.73
Creole	10.49	9.02	10.30	11.32	7.72	9.60



Column 1 is the *uncontrolled* arrangement. Comparing this with the *controlled* arrangements, the following differences in rank are noted (a plus (+) indicating an increase in rank, i.e., higher position value; minus (—) indicating a decrease in rank, i.e., a lower position value) :

	Color	Richness	Pleas- ingness	Simplicity	Appropri- ateness
Del Monte	0	0	0	—2	0
Mission	—1	—1	0	—2	—2
Gold Seal	—3	+1	—1	—2	+1
Ideal	0	—1	+1	+3	+1
Acme	+3	—1	—1	+3	0
Griffon	—3	+2	—4	—1	—2
Sweet Brier	+2	0	0	—1	+1
Oak	0	0	+3	+1	—1
Banquet	—2	—2	—2	—3	+2
Swallow	+3	+1	+2	—1	0
Bouquet	+1	+1	+2	+1	0
Creole	0	0	0	+3	0

The following table shows which set of directions brought out the clearest contrast between the labels:

	Highest average position given to any label	Lowest average position given to any label	Range
Uncontrolled	2.35	10.49	8.14
Color	3.32	9.02	5.70
Richness	3.51	10.30	6.79
Pleasingness	3.67	11.32	7.66
Simplicity	1.48	11.37	9.89
Appropriateness	4.51	9.60	5.09

The position value for the cans arranged according to *simplicity* ranges from 1.48 to 11.37, showing how closely the subjects agree in their choice. This arrangement was more mechanical than the others. It was possible to eliminate the other factors and consider the single factor, which seemed to be impossible with the arrangements according to the other incentives. It is of interest to note in this arrangement that Ideal and Acme rise in rank, and Del Monte, which is first in all other arrangements, drops to third place, but still has a higher position than it holds in any of the other *controlled* arrangements. Creole at

ninth place holds a much lower position value than it holds in any of the other arrangements at twelfth place. This is the only arrangement in which Del Monte is not first and Creole is not last.

Appropriateness is the least mechanical as well as the least intelligible, in consequence of which the subjects were unable to agree and the range of position value is very small—from 4.51 for the best to 9.60 for the worst.

Color scheme, which the subjects considered to mean an arrangement on an aesthetic basis, has also a comparatively small range of position value, showing nothing more than an arrangement according to color harmony instead of according to strikingness as was expected.

It is of interest to note that Acme and Swallow in this arrangement rise in position value, while Griffon and Gold Seal fall, which is probably due to a sex difference and might not be the same were the arrangements made by a group of men.

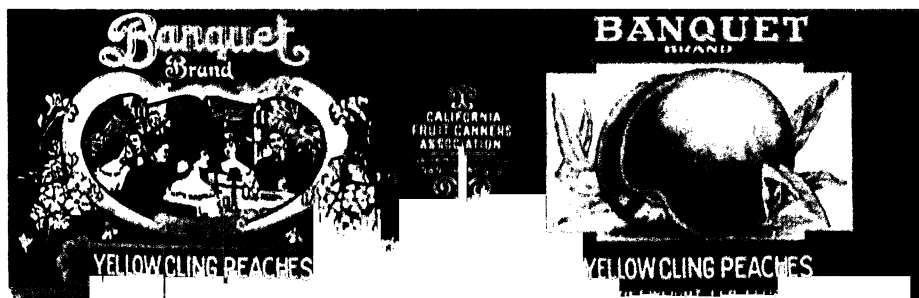
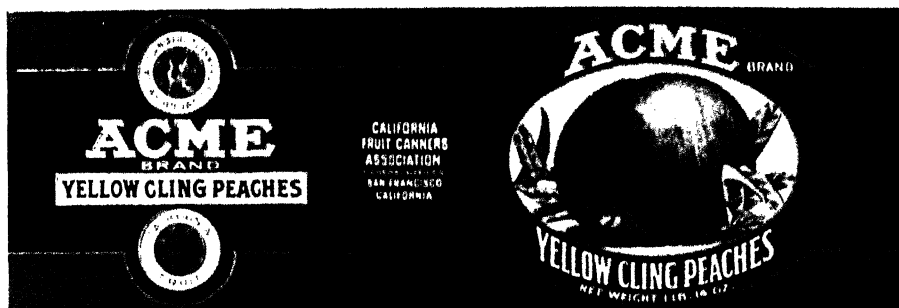
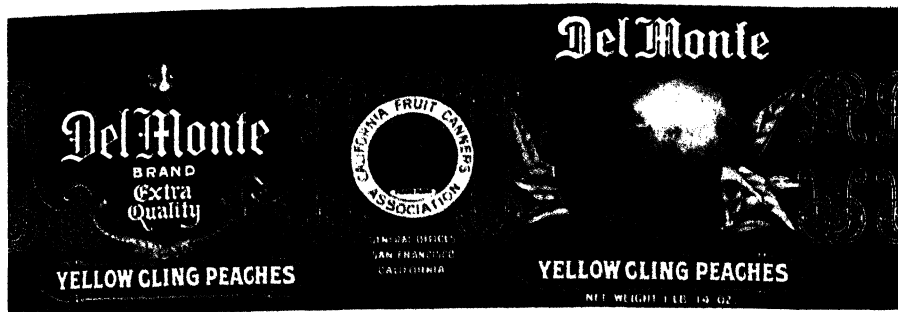
Richness caused the subjects a great deal of difficulty. It is ambiguous and could not be isolated from the other factors.

Pleasingness seems to have meant nothing more to the observers than a pleasing color combination and the arrangement is very similar to the one under color.

As the following table shows, there is a high correlation between the arrangements according to separate factors, and the *uncontrolled* judgment.

	CORRELATIONS					
	Color	Richness	Pleasing- ness	Sim- plicity	Appropri- ateness	Uncon- trolled
Color	.....	0.75	0.86	0.79	0.77	0.82
Richness	0.75	.....	0.75	0.73	0.84	0.94
Pleasingness	0.86	0.75	.....	0.78	0.80	0.85
Simplicity	0.79	0.73	0.76	.....	0.73	0.80
Appropriateness	0.79	0.84	0.80	0.73	.....	0.94
Uncontrolled	0.83	0.95	0.85	0.80	0.94	.....

The correlations are all very high, especially between the various *controlled* arrangements and the *uncontrolled* arrangement; the two lowest correlations are between *simplicity* and



richness, and *simplicity* and *appropriateness*, in each case 0.73. The two highest correlations are between *uncontrolled* judgment and *richness*, and between *uncontrolled* judgment and *appropriateness*. In the former it is 0.95 and in the latter 0.94, both figures showing nearly perfect correlation. Probably the factor of previous familiarity is responsible for some part of this correlation.

These high correlations indicate that the *uncontrolled* judgments are not affected by one factor more than another, and that it is difficult to isolate any one factor with the possible exception of a purely mechanical element like *simplicity*.

The final arrangements would suggest that either these incentives are not wholly exhaustive of *uncontrolled* judgment or that perhaps *uncontrolled* judgment rests upon only a single incentive.

PART III DIVISION A

In this part of the problem, price was made the principal factor. The original retail prices for the various qualities were as follows:

Quality 1	25 cents per can
Quality 2	20 cents per can
Quality 3	15 cents per can
Quality 4	12½ cents per can
Quality 5	10 cents per can

In order to simplify the problem, only four brands were considered. Del Monte was eliminated on account of its familiarity; Mission was chosen as it came next to Del Monte; Acme and Ideal because they ranked about middle in the previous experiment; and Creole on account of its appearing always at the end of the list.

The observer was given to understand that he had an imaginary \$1.20 to spend in purchasing one of the four brands of canned peaches shown him. Each brand, in turn, was assigned a value of one of the four prices (30 cents, 20 cents, 15 cents or 10

cents) while the other three were given the other prices. The prices changed from brand to brand, so that all of the twenty-four possible combinations were presented to the subjects an equal number of times. No observer, however, had more than one arrangement.

The directions given to the subjects read as follows:

In this experiment please try to imagine yourself in the circumstances described below.

You have \$1.20 in your possession with which to purchase canned peaches to be served at your table to a group of friends for dessert.

Assume that all of this \$1.20 has to be spent in the purchase of one of the brands shown. Which would you choose?

The results for one hundred and forty-four cases, about equally divided between men and women, were as follows:

	30 cents	20 cents	15 cents	10 cents	Total
Ideal	21	20	6	1	48
Acme	21	17	7	3	48
Mission	14	17	4	....	35
Creole	4	8	1	....	13
	—	—	—	—	—
Total	60	62	18	4	144

It is of interest to note that Mission, which appeared in the former experiment to be a superior brand, comes after Ideal and Acme in this arrangement. Creole as in the other arrangements, is last. There appears to be more demand for this poor brand at thirty and twenty cents than at lower figures, showing that raising the price tends to increase the demand for a very poor brand as well as for other brands. From the above figures it would appear that twenty cents is the correct amount to charge college students, as more of them will buy at this figure than at any other. In monetary return, thirty cents seems to be preferable; there are not quite so many actual sales, but the total returns are greater, which is of course most important for the storekeeper.

PART III DIVISION B

Further consideration of the price factor suggested that price, popularity, and demand are intimately related.

The Del Monte brand was chosen for this part of the experiment because it was the most popular, and the Griffon because it was the most expensive.

Four different prices were assigned alternately to Del Monte. It was first shown to thirty six subjects from Division A, bearing the price of 20 cents, to the next thirty six subjects marked at 30 cents, to the next group marked at 40 cents, and to the last group marked at 60 cents. In all cases it was shown along with Gold Seal and Bouquet, which were assigned prices of 10 cents and 15 cents, the prices being alternated on these two so that all possible combinations were obtained. Griffon was later shown under the same conditions as Del Monte, to the same groups of subjects.

The subjects were given the same set of written directions as for Division A.

The following table shows the distribution of choice:

			Gold Seal 15 cents	Gold Seal 10 cents	Bouquet 15 cents	Bouquet 10 cents
{	Del Monte	20 cents	31	2	3	....
{	Griffon	20 cents	25	5	6	....
{	Del Monte	30 cents	34	1	3	....
{	Griffon	30 cents	36	4	2	....
{	Del Monte	40 cents	25	5	1	5
{	Griffon	40 cents	21	5	5	5
{	Del Monte	60 cents	16	9	2	9
{	Griffon	60 cents	11	10	6	9

This table shows that Del Monte, which is really inferior to Griffon, is chosen at a higher price on account of familiarity. There appears to be an increase in demand for the less popular brands as their price is increased. This is illustrated by the fact that the demand for Griffon is increased nearly 50 per cent

when sold at 30 cents instead of 20 cents. Bouquet does not create a single demand at 10 cents, but is just as popular, at 15 cents, as Gold Seal, although the latter has some demand at 10 cents.

SUMMARY

1. The best labels are actually used by the canners for superior qualities of goods, but there is no exact relation between the quality of the goods and the label.

2. All factors are so closely related that it is impossible to separate them. In making such an arrangement the exact wording of the directions is immaterial, since the arrangement under the directions intended to control the judgment is practically the same as the uncontrolled arrangement.

3. Other conditions being equal, more subjects, in 1916-1917, will pay 20 cents than 30 cents, 15 cents or 10 cents. All brands sell better at 20 cents or 30 cents than at 10 cents or 15 cents. Some brands have a larger sale at the higher prices than others; others can scarcely be disposed of at any price. The familiar brand has more sales at higher prices than an unknown brand that is in fact a superior quality. As price is increased until it becomes exorbitant, the number of sales does not decrease in proportion, so that returns to a dealer at higher prices are greater than at a moderate price.

UNIVERSITY OF CALIFORNIA PUBLICATIONS
IN
PSYCHOLOGY

Vol. 3, No. 3, pp. 73-145

December 30, 1924

**A STUDY OF THE MAJOR EMOTIONS
IN PERSONS OF DEFECTIVE
INTELLIGENCE**

BY
BEULAH MAY MORRISON

UNIVERSITY OF CALIFORNIA PRESS
BERKELEY

UNIVERSITY OF CALIFORNIA PUGLICATIONS

Note.—The University of California Publications are offered in exchange for the publications of learned societies and institutions, universities and libraries. Complete lists of all the publications of the University will be sent upon request. For sample copies, lists of publications or other information address the **MANAGER OF THE UNIVERSITY PRESS, BERKELEY, CALIFORNIA, U. S. A.** All matter sent in exchange should be addressed to **EXCHANGE DEPARTMENT, UNIVERSITY OF CALIFORNIA LIBRARY, BERKELEY, CALIFORNIA, U. S. A.**

Publications of the University of California Press may also be obtained from **THE CAMBRIDGE UNIVERSITY PRESS, FETTER LANE, LONDON, E. C. 4, ENGLAND**, to which orders originating in Great Britain and Ireland should be sent.

PSYCHOLOGY.—George M. Stratton, Warner Brown, and Edward C. Tolman, Editors.
Price per volume, \$3.50. Cited as Univ. Calif. Publ. Psychol.

Vol. 1.	1. The Judgment of Difference, with Special Reference to the Doctrine of the Threshold, in the Case of Lifted Weights, by Warner Brown. Pp. 1-71, 4 text figures. September, 1910	\$0.50
	2. The Process of Abstraction, an Experimental Study, by Thomas Verner Moore. Pp. 73-197, 6 text figures. November, 1910	1.00
	3. The Judgment of Very Weak Sensory Stimuli, with Special Reference to the Absolute Threshold of Sensation for Common Salt, by Warner Brown. Pp. 199-268, plates 1-4. February, 1914 .....	.60
	4. Habit Interference in Sorting Cards, by Warner Brown. Pp. 269-321. April, 1914 .....	.50
	5. Diurnal Variations in Memory and Association, by Arthur I. Gates. Pp. 323-344. March, 1916 .....	.20
	6. Correlations and Sex Differences in Memory and Substitution, by Arthur I. Gates. Pp. 345-350. May, 1916 .....	.05
Vol. 2.	1. Variations in Efficiency during the Day, together with Practice Effects, Sex Differences, and Correlations, by Arthur I. Gates. Pp. 1-156. March, 1916	1.50
	2. Experiments on Attention and Memory, with Special Reference to the Psychology of Advertising, by J. M. Levy. Pp. 157-197. March, 1916 .....	.40
	3. The Psychology and Physiology of Mirror-Writing, by Justin K. Fuller. Pp. 199-265. May, 1916 .....	.70
	4. Memory and Association in the Case of Street-Car Advertising Cards, by Walter S. Heller and Warner Brown. Pp. 267-275. May, 1916 .....	.10
	5. A Comparison of the Japanese Folk-Song and the Occidental: A Study in the Psychology of Form, by Sangoro Ito. Pp. 277-290. May, 1916 .....	.15
	6. Individual and Sex Differences in Suggestibility, by Warner Brown. Pp. 291-430. July, 1916	1.50
Vol. 3.	1. An Experimental Study of Abnormal Children, with Special Reference to the Problems of Dependency and Delinquency, by Olga Bridgman. Pp. 1-59. March, 1918 .....	.65
	2. Analysis of Package Labels, by Walter S. Heller. Pp. 61-72, plates 1-3. January, 1919 .....	.15
	3. A Study of the Major Emotions in Persons of Defective Intelligence, by Beulah May Morrison. Pp. 73-145. December, 1924 .....	.90

PHILOSOPHY.—George P. Adams, J. Loewenberg, and S. C. Pepper, Editors.
Cited as Univ. Calif. Publ. Philos.

The first volume of the University of California Publications in Philosophy appeared in November, 1904, and was prepared in commemoration of the seventieth birthday of Professor George Holmes Howison, under the direction of a committee of his pupils composed of Evander Bradley McGilvary, Charles Henry Rieber, Harry Allen Overstreet and Charles Montague Bakewell. The price of the volume is \$2. It may be had bound, or the papers may be obtained separately. Its contents are:

Vol. 1.	1. The Summum Bonum, by Evander Bradley McGilvary. Pp. 1-27 .....	.25
	2. The Essentials of Human Faculty, by Sidney Edward Mezes. Pp. 28-55 .....	.25
	3. Some Scientific Apologies for Evil, by George Malcolm Stratton. Pp. 56-71 .....	.15
	4. Pragmatism and the <i>a priori</i> , by Charles Henry Rieber. Pp. 72-91 .....	.20
	5. Latter-day Flowing-Philosophy, by Charles Montague Bakewell. Pp. 92-114 .....	.20
	6. Some Problems in Evolution and Education, by Ernest Norton Henderson. Pp. 115-124 .....	.10

UNIVERSITY OF CALIFORNIA PUBLICATIONS
IN
PSYCHOLOGY

Vol. 3, No. 3, pp. 73-145

December 30, 1924

A STUDY OF THE MAJOR EMOTIONS
IN PERSONS OF DEFECTIVE
INTELLIGENCE

BY
BEULAH MAY MORRISON

CONTENTS

	PAGE
I. Introduction	73
II. Literature of the subject	74
III. The individuals studied in this investigation: method of selection, and the characteristics of the group	80
IV. Data: nature, and methods of collection	84
V. Anger	92
VI. Affection	111
VII. Fear	125
VIII. General considerations, and summary of conclusions	135
References	141
Appendix	143

I. INTRODUCTION

The study presented here has been undertaken with the hope of contributing to our knowledge of the emotions in persons of defective intelligence. Detailed study has been made only of the so-called major emotions, anger, fear, and affection; or, as some would prefer to state it, of reactions which are commonly taken to be the expressions of these emotions. In dealing with the data an effort has been made to express them in quantitative terms.

The place of research was the Sonoma State Home for the Feeble-minded, at Eldridge, California. This institution is particularly suitable for such an investigation, since it shelters some fifteen hundred mental defectives, including nearly all types and degrees of defect. However, one must bear in mind that a study made in an institution may not lead to conclusions which can be applied without error to defectives living under home conditions; and that conditions in this particular institution may be so different in some respects from those in other institutions of its kind that the findings would not be entirely true for inmates elsewhere.

The writer wishes to express her appreciation of the aid rendered by the officers and assistants at that institution. In particular she is grateful to Dr. F. O. Butler, Medical Superintendent, who has shown a deep interest in the work, and who always has made the circumstances as favorable as possible for the investigation; and to Dr. George Ordahl, Psychologist and Director of Education, who has been ever ready with most valuable suggestions and encouragement. Further, she deeply appreciates the careful guidance given her throughout the study by the members of the faculty in psychology at the University of California.

II. LITERATURE OF THE SUBJECT

A careful survey of the literature on mental defectives has led to the conclusion that their emotions are a field almost untouched by scientific research. Mrs. Hollingworth¹² states the same conclusion in these words: "No prolonged and systematic study has been made of the instinctive and emotional life of the feeble-minded." (p. 154.)

Since the study of mental defectives was begun in 1797 (when "le Sauvage de L'Aveyron" was found), there has been a steady widening of the field of investigation. The literature to 1890 may be called non-psychological, for it deals with the pathological anatomy and physiology, the causes, classifications, and education

of idiots and imbeciles. The publication of Sollier's book, *Psychologie de l'Idiot et de l'Imbécile* in 1891, marks the beginning of a psychology of the feeble-minded. Until 1900 the work consisted largely of general observations, and then there began in several countries a long period of experimental work on the senses and intellectual processes. Since the Binet-Simon tests were published, interest has been centered in determining mental levels and in discovering the social efficiency of defectives. The study of their affective psychology has been pushed always into the future.

To the writer there seem to be at least three reasons for this delay: first, the dominant interest of each succeeding period in the development of our knowledge of the feeble-minded was centered elsewhere; second, a knowledge of their instincts, feelings, and emotions was, until recently, considered to be relatively unimportant; and third, the great difficulty in devising exact methods of observation and experiment in this field has been discouraging. However, the present tendency to believe that the social efficiency of a subnormal person depends upon his personality and stability of character, as well as upon his general intelligence, is a hopeful sign that more attention will be directed to the affective side of his psychology.

A clearer understanding of the literature of this subject will be gained by a division of the references into the following five groups:

1. SYSTEMATIC INVESTIGATION.

Wylie⁴¹ alone has made a systematic investigation of the emotions of the feeble-minded in relation to the degree of their intelligence. He bases his conclusions upon information concerning 26 individuals, obtained by questioning those most intimately acquainted with them.

2. BOOKS ON THE PSYCHOLOGY OF THE FEEBLEMINDED OR THE COMPARATIVE PSYCHOLOGY OF THE NORMAL AND SUBNORMAL.

Such works as these offer by far the largest part of the material on this subject. The accounts given are not based upon systematic observation or experiment, but are generalizations from a wide experience and a survey of the literature. The works of Sollier³¹ (chaps. 5, 6), Hollingworth¹³ (chap. 9), and Goddard⁹ (Pt. I, chap. 8; Pt. II, chap. 4) may be cited as typical.

3. BOOKS ON GENERAL PSYCHIATRY.

Many books on general psychiatry give brief summaries of the instincts and emotions in mental defectives which, almost without exception, are repetitions of what has been stated by other writers. The source most frequently drawn upon is Sollier's work. Such is the nature of the accounts given by Church and Peterson³ (chap. 12), and Tanzi³² (pp. 752 ff.).

4. MISCELLANEOUS STUDIES OF MENTAL DEFICIENCY.

Studies on various phases of mental deficiency often have observations tucked away in them which are pertinent to the subject before us. Binet² (Pt. I, chap. 1) concludes that there is no relation between the different types of character and any certain mental level. The Ordahls²³ note, in connection with some tests they were giving, that the higher the intelligence the more interest was shown in the work and the more desire there was for social approval. Murphy²¹ (p. 595) finds that many defective mothers are over-sexed, but show little maternal affection.

5. BOOKS ON THE EMOTIONS IN GENERAL.

In such works on the emotions as those of Darwin⁶ (pp. 197, 243, 310), Férés (pp. 442 ff.), and Ribot²⁶ (p. 221), one finds brief notes on the subject at hand.

We cannot compare unconditionally statements made by authors who have written at widely separated dates, because of the changing principles of classification and the widening of the

limits of defective mentality. Seguin²⁸ classifies defectives as profound and superficial idiots, according to physiological conditions; Sollier³¹ divides them into absolute and simple idiots, and imbeciles, according to the degree and quality of attention; while modern writers, as Tredgold³⁴ and Goddard,⁹ classify them on the basis of general intelligence as idiots, imbeciles, and feeble-minded or morons. Our greatest difficulty is met in comparing the observations of Sollier with those of recent writers, for his conviction that idiots and imbeciles are radically different in character—that idiots are extra-social, while imbeciles are cruel, egotistical, and anti-social—colors every statement he makes³¹ (p. 98).

We will now summarize the main points found in the literature on each of the major emotions, and review the conclusions.

ANGER

Most of the earlier writers, as Sollier³¹ (pp. 112 ff.), emphasize the two wide classes of idiots and imbeciles—the apathetic and excitable types—without attempting any finer distinctions. Ribot generalizes thus: "The lowest in evolution are continually exercising their anger: . . . idiots and imbeciles on anyone who does not resist them."³⁰ (p. 221). Péro³⁸ (pp. 442 ff.), however, concludes that irritability is little developed in idiots, and is considerably diminished in imbeciles (with respect to the normal). Goddard's statement is not in exact agreement with the foregoing: "Pugnacity and anger are in evidence in all grades";⁹ (p. 145) and "Pugnacity . . . or the emotion of anger is one of the few emotions that remains fairly constant. It is mainly aroused by its specific stimulus. As a result this instinct appears normally developed in defectives."¹⁰ (p. 149). Wylie⁴¹ finds that anger, although it occurs more frequently than fear, is deficient and irregular, and that there is less self-control than is found in normal children.

AFFECTION

The consensus of opinion is that affection is very common in mental defectives: indiscriminate and dog-like in the lower grades, and superficial and transient in the higher grades. Sollier³¹ (pp. 104 ff.) observes that idiots in general readily form attachments and sometimes show considerable filial affection; but that imbeciles show little affection toward anyone. Goddard limits his statement to a particular kind of affection: "The paternal instinct with its tender emotion is clearly developed in the chronologically older cases, and extends fairly well down the mental scale. Morons, both boys and girls, delight to take care of younger children and manifest toward them what seems to be real paternal feeling."⁹ (pp. 145, 146.) Mrs. Hollingworth believes that there is almost a normal amount of affection present: "Of the instincts which do not ordinarily lead to crime, such as the tendency to feel pleased at the approval of others, and the tendency to be satisfied by seeing others comfortable and happy, there is every reason to suppose that these are as well developed in the subnormal as are the instincts which lead more readily into difficulty. Mentally deficient children are as susceptible as others to nods and pats of approval, to smiles, praise and rewards, and their affection as readily attaches to those who win their confidence."¹³ (pp. 164, 165.) Wylie⁴¹ found that affection was shown by a desire to fondle and be fondled, and that it was very common among defective children, perhaps more so among the duller ones.

All writers are agreed that sex emotion, if present, is very apt to be perverted or uncontrolled.

FEAR

There is some difference of opinion regarding fear. Sollier³¹ (pp. 111 ff.) believes that idiots are usually very timid, because they cannot explain things. The imbecile, he thinks, is a being almost lacking in fear, and at times seems to show great courage,

which is due to his inability to realize the significance of the situation. Hollander¹² (p. 36) agrees with Sollier in regard to fear in idiots. The observation of Goddard is significant: "Flight with its emotion of fear is found well down the scale, possibly even to the lowest," and "the feeble-minded show about a normal amount of fear until we get up to those things that depend upon intelligence."¹³ (pp. 147, 148.) Wylie¹⁴ found fear in all grades, but only in a small proportion of the cases; and, although he thinks that the protection of the institution may partly account for this, he concludes that "fear appears as a mental remnant and is markedly deficient among feeble-minded children." The statement made by Marr¹⁵ (p. 25), that in the ordinary school the fears of feeble-minded children may become highly developed, indicates that we should study these people outside of an institution—in the home and in the public school—before we regard our conclusions as final. Binet would agree with us here, for he states that "it is not the imbecile in a hospital, it is the imbecile in his family, or in a family colony that one must know."¹⁶ (p. 13.) It would seem that the person of defective intelligence may show either an unusual amount of fear, or an extraordinary lack of fear, both due possibly to his inability to grasp a situation or to realize the consequences of his acts.

CONCLUSIONS

Most writers, especially the later ones, are agreed that the expression of the emotions in mental defectives is connected in some way with the degree of their intelligence. Sollier¹⁷ (p. 101) makes no general statement to cover all his observations, but he does say that in the 'profound' idiot there are scarcely any feelings or emotions; and he treats simple idiots and imbeciles more as if they were different in kind than in degree of intelligence. Féré writes thus: "In imbeciles and especially in idiots emotivity is weakened or altered contemporaneously with intellectual activity and sensibility."¹⁸ (pp. 442, 443.) Mrs. Hollingworth states that "there seems no possible doubt that in respect to instincts

and emotions the feeble-minded approach much nearer the norms than they do in intelligence."¹³ (p. 154.) Tredgold's belief is that "... the capacity for expressing emotion in these persons [mental defectives] is usually proportionate to the amount of general intelligence present, although something seems to depend upon the particular variety of nervous temperament."¹⁴ (pp. 121, 122.) Goddard concludes that "all the primary instincts with their accompanying emotions according to McDougall's list are present in the feeble-minded"¹⁵ (pp. 145, 146); and that the emotions are controlled and modified in proportion to the degree of intelligence.⁹ (Pt. II, chap. 4.) Wylie's findings⁴¹ lead him to state that the emotions and instincts in the feeble-minded usually lack both in fulness of expression and feeling, and that some of them may not appear at all.

III. THE INDIVIDUALS STUDIED IN THIS INVESTIGATION: METHOD OF SELECTION, AND THE CHARACTERISTICS OF THE GROUP

When the selection of subjects for this investigation was being made, two central purposes were held in view: the one, of getting a fairly even distribution of mental age from the lowest to the highest levels in the institution; and the other, of concentrating the work in a relatively few cottages and dormitories, in order to facilitate the work of experimentation and observation.

By the use of the I.Q., approximately 75 cases were selected from the card file of patients (an equal number of male and female) for each of the four groups, idiot, imbecile, moron, and borderline. These groups were defined according to the limits suggested by Terman³³ (pp. 79 ff.). The idiot group ranges in I.Q. from 1 to 19, the imbecile group from 20 to 49, the morons from 50 to 69, and the "borderlines" from 70 to 100 inclusive. The latter group includes not only Terman's "borderlines" (70 to 80 I.Q.), but also his dull normal (80 to 90 I.Q.) and part of his average group (90 to 110 I.Q.). The cases in this group whose

I.Q.'s range from 80 to 100 have been placed in the institution because of instability and moral deficiencies, rather than because of seriously defective general intelligence. This method of grouping has proved to be very useful in the subsequent presentation of data.

In the inevitable elimination three factors operated. First, those were eliminated who were found to be resident in quarters neither convenient nor favorable to the investigation. Then, after several months' study of the individual cases, a further elimination was made of those who clearly belonged to the extremely disturbed types of epileptics, of insane, and of psychopaths. This step seemed advisable because the presence of those definitely disturbed individuals threatened to complicate the situation so far as to obscure tendencies that might be present in the more stable types. Finally, a number were thrown out because the data concerning them were insufficient. The causes of this condition were several: the patients may have died, been dismissed or paroled, or moved to a place too distant.

The total number remaining after elimination is 228, making a few over 50 in each of the four groups. The following table shows the number in each group together with the proportion of male to female subjects. In the whole group of 228 this proportion is about 2 male to 3 female.

TABLE 1
NUMBER OF MALE AND FEMALE SUBJECTS IN THE VARIOUS GROUPS
WITH TOTALS

Group	I.Q.	Male	Female	Total
Idiot	1-19	22	30	52
Imbecile	20-49	31	37	68
Moron	50-69	19	35	54
Borderline	70-100	17	37	54
Total	1-100	89	139	228

By far the greater part of the mental ages and the I.Q.'s were determined during and since the year 1916 by Dr. Ordahl and his assistants, by means of the Terman Revision of the Binet-Simon tests. For the present these I.Q.'s are assumed to have been correctly determined.

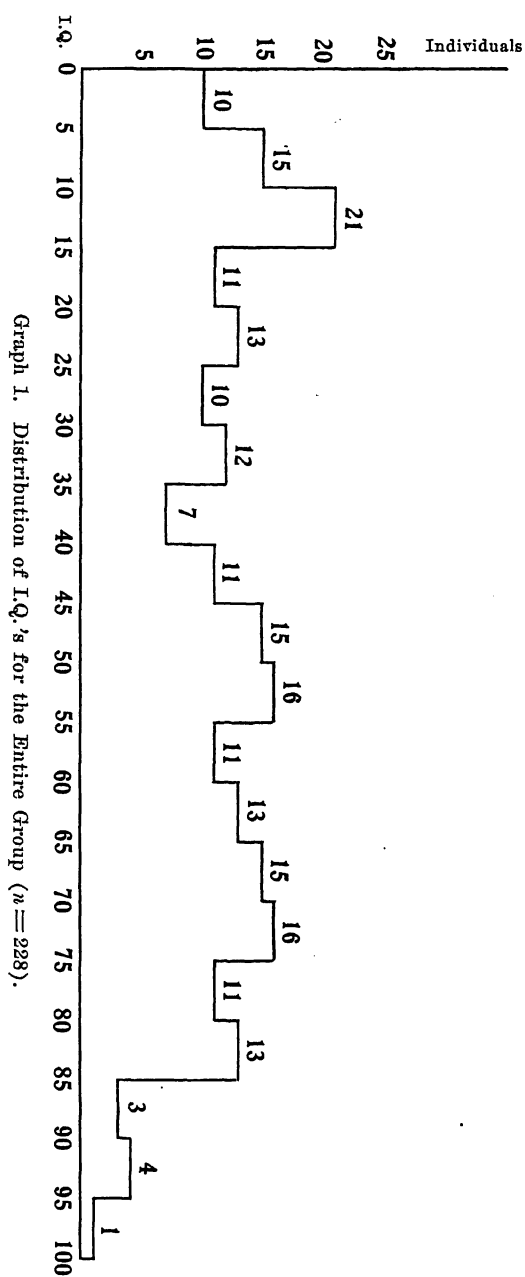
In graph 1 is presented the distribution of I.Q.'s for the whole group. The rectangular character of this distribution is, of course, due to the manner in which the subjects were chosen. Assuming these I.Q.'s to be constant, the mental ages have been corrected¹ to July 31, 1922, the date which marks the conclusion of the observations.

The distribution of these corrected mental ages expressed in months is shown in table 2. The tendency of the number of cases to become less as the mental age becomes higher is due mainly to the fact that there are found, in the institution as a whole, far more of the lower than of the higher mental ages, and so a random selection would result in more of the lower grades. Furthermore, the third factor of elimination would operate more among the higher grades; that is, dismissal from the institution, parole, or transfer to another farm in order to go to work.

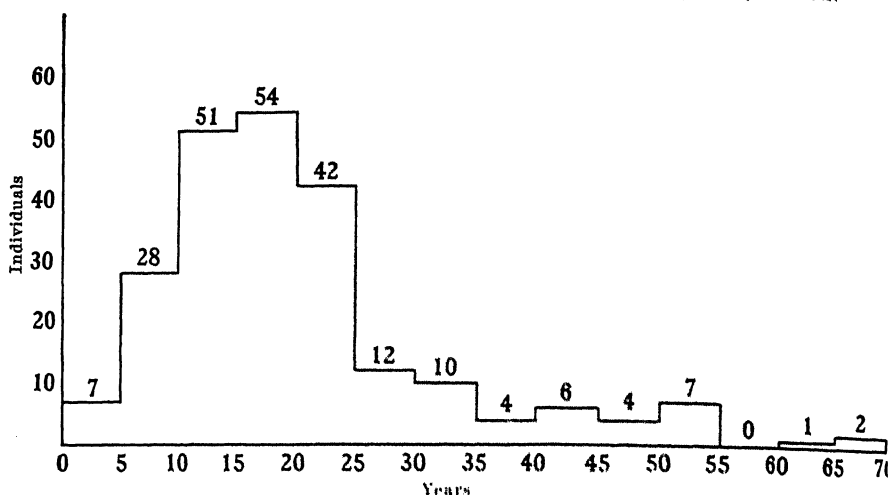
TABLE 2
MENTAL AGES WITHIN THE CONSTITUENT GROUPS

M.A. in months	Idiot	Imbecile	Moron	Borderline	Total
1-12	24				24
13-24	20	2			22
25-36	8	6	2		16
37-48		19	2		21
49-60		12	1		13
61-72		8	2	1	11
73-84		10	2	1	13
85-96		11	7	0	18
97-108			16	4	20
109-120			13	2	15
121-132			7	5	12
133-144			2	16	18
145-156				11	11
157-168				9	9
169-180				4	4
181-192				1	1
Total	52	68	51	51	222

¹ Since $I. Q. = \frac{M.A.}{A.A.}$, if the I.Q. is assumed to be constant, $A.A. \text{ to date} \times I.Q. = M.A. \text{ to same date}$.



Although the actual age of each individual is involved in the I.Q., the latter does not present the whole picture, for the adult level has been assumed to be 16 years in the computing of the



Graph 2. Distribution of Actual Ages for the Entire Group ($n = 228$).

I.Q. To complete the picture the distribution of actual ages on July 31, 1922, is shown in graph 2. Although these ages are distributed between a point below 5 years and up to 70 years, 194 of the total 228 are seen to have an actual age between 5 and 30 years. The distribution of these 194 is almost symmetrical.

IV. DATA: NATURE, AND METHODS OF COLLECTION

Throughout this study the investigator's attention was concentrated upon the behavior of the subjects, and an effort was made to note the specific reactions which were the constituents of any instance of behavior. Certain groups of reactions, after the cause or the occasion of the behavior had been duly considered, were taken to be the outward expressions of the three emotions, anger, fear, and affection.

The definitions of these groups of reactions are the result of careful consideration of writings on the emotions by such authors

as Darwin^a and Ribot,^{2a} and of many pertinent suggestions offered by the students and faculty in the seminar in psychology at the University of California.

Besides noting the specific reactions, an attempt was made to ascertain the cause or occasion of the behavior, and something regarding the mental and physiological condition of the subject. The duration of each instance of behavior was either noted or estimated, and an effort was made to determine the relative frequency, at least, of such behavior. It was necessary to judge the intensity of the emotion by the duration and by the number and character of the specific reactions.

There will now be set down in brief the several types of reactions which were always kept in mind while any emotional response was being investigated.

1. Expressions of the Face.
 - a. Eyes, brows.
 - b. Lips, mouth, jaws.
 - c. Nostrils.
 - d. Color of face.
 - e. Perspiration.
2. Vocal-motor Reactions.
 - a. Inarticulate sounds.
 - b. Speech.
 - c. Character of voice.
3. Cardio-respiratory and Vaso motor Reactions.
 - a. Chest movements, respiration.
 - b. Heartbeat.
 - c. Appearance of blood vessels.
 - d. Color of skin.
4. Posture and Movements of the Body.
 - a. General posture.
 - b. Slight movements.
 - c. Large movements.
5. Position and Movements of the Limbs.
 - a. Position and appearance of hands.
 - b. Gestures.
 - c. Large movements of the limbs.

6. General Attitude toward Associates and Surroundings before and after the Emotional Reaction.
 - a. Social attitude.
 - b. Obedience.
 - c. Mood.

Using the foregoing outline as a guide, let us now turn to the specific reactions which we assume to be the expressions of these emotions, provided the circumstances are duly considered.

ANGER

1. Expression of the Face.
 - a. Brows contracted, eyes narrowed.
Brows raised, eyes wide and glaring.
Brows level, eyes fixed, glance cold and steady.
 - b. Mouth closed, lips thin, jaws set.
Mouth open (as in loud speech).
Mouth open slightly, lips curled, or twisted.
 - c. Nostrils distended.
 - d. Face flushed, pale, or of blotchy appearance.
 - e. Perspiration on forehead and upper lip.
2. Vocal-motor Reactions.
 - a. Nasal and guttural sounds.
 - b. Cursing, sarcasm, insults, etc.
 - c. Voice loud, hoarse, or low and threatening.
3. Cardio-respiratory and Vaso-motor Reactions.
 - a. Very marked chest movements, deep and rapid breathing.
 - b. Increased strength and rate of heartbeat (seldom observed).
 - c. Blood vessels of neck, face, and arms, distended.
 - d. Color of skin, flushed or pale.
4. Posture and Movements of the Body.
 - a. Erect, rigid.
Slightly crouched, and bent forward.
 - b. Trembling.
 - c. Running toward or throwing body against the offending object.
Spitting upon the offending object.
5. Position and Movements of the Limbs.
 - a. Fists clenched.
Fingers claw-like.
 - b. Emphatic gestures of arms accompanying angry words.
 - c. Pulling hair, striking, kicking.

6. General Attitude.

- a. Unsociable.
- b. Disobedient, resentful.
- c. Irritable, sullen.

FEAR

1. Expression of the Face.

- a. Eyes staring, brows raised.
- b. Mouth open, lips quivering.
- c. Nostrils distended.
- d. Face pale, or possibly flushed.
- e. Cold perspiration.

2. Vocal-motor Reactions.

- a. Cries, screaming.
- b. Words of distress, pain, etc.
Prohibitive commands.
- c. Voice husky, loud and high, hushed and low.

3. Cardio-respiratory and Vaso-motor Reactions.

- a. Very marked chest movements, deep and rapid breathing.
- b. Increased strength and rate of heartbeat (seldom observed).
- c. Blood vessels of neck, face, and arms, distended.
- d. Color of skin, pale or flushed.

4. Posture and Movements of the Body.

- a. Body rigid, motionless.
Crouched.
Withdrawing.
- b. Trembling.
Shivering.
Erection of hair.
- c. Drawing or shrinking away.
Headlong flight.

5. Position and Movements of the Limbs.

- a. Hands clenched or shaking.
- b. Arms thrust forward or thrown up toward face as if to push away or ward off the fearful thing.
- c. Actually pushing away the fearful object.
Striking, kicking, fighting.

6. General Attitude.

- a. Of desire not to be alone.
- b. Refusal to go to certain places.
- c. Of despondency, tearfulness.

AFFECTION

1. Expression of the Face.

- a. Eyes bright, open, focussed on the attractive object.
Brows raised or level.
- b. Mouth smiling, kissing.
- c. Face flushed as in blushing.

2. Vocal-motor Reactions.

- a. Crooning, gurgling, etc.
- b. Pleasant, friendly speech.
Soothing and endearing words spoken to or about the object of affection.
- c. Voice calm and low, clear and hearty.

3. Cardio-respiratory and Vaso-motor Reactions.

These responses are very difficult to detect in affection, but we do get a hint of them in blushing.

4. Posture and Movements of the Body.

- a. Posture relaxed, comfortable.
- b. Leaning toward or against the attractive object.
- c. Walking or running toward it.

5. Position and Movement of the Limbs.

- a. Hands relaxed, or spread out as in patting.
- b. Gestures slow and gentle, as in stroking and patting.
Protective gestures.
- c. Caressing, embracing.
Striking, kicking, even fighting to protect the beloved object.

6. General Attitude.

- a. Friendly, sociable, talkative.
- b. Desire to be near the beloved object.
- c. Pain or distress (tears) when separated from the beloved object.
- d. Desire to do for and give to the beloved object.

The matter of general attitude has proved to be very important in investigating affection. Where one does not find specific bodily reactions he often will find these indications of general attitude which are pertinent. The matter of sexual love is considered to be affection only in so far as it involves some of the foregoing expressions of affection.

RECORDS

There were several kinds of record on file which were useful in this study. The card files of patients in the psychologist's office afforded in each case the following information: date of birth, date of mental test, mental age, I.Q., and often some note on the psychiatric diagnosis or psychological analysis of the test performance.

Under the direction of the psychological department certain industrial records, which include conduct records, were made of all those patients who might be paroled; these patients included a number of the high-grade women.

About six months before the close of this study, the field workers at Eldridge, under the supervision of the Research Department of the Whittier Industrial School, had begun to write case histories of some of the highest-grade patients. Ten of these histories were available, and in them the specific statements were found to agree closely with the writer's own observations.

For all the school children there were found usually comments and short summaries by the teachers, which often gave some points on general conduct and, indeed, on emotional reactions.

The information drawn from the foregoing four sources is considered to be reliable, and some of it has been checked by the writer's own observations.

The one other type of record available is the application for admission to the Home. Although in every case the investigator has read these carefully, she has discarded nearly all statements made in them concerning emotional reactions, for often the blanks obviously were filled in by persons who had only a most superficial acquaintance with the patient in question.

INTERVIEWS

As many as possible of the officers and attendants who were well acquainted with the subjects under observation were interviewed at least once, and, in case of doubt on any point, several

times. The person interviewed usually was asked to give a general account of the subject with particular reference to his emotional behavior; and afterward, using as guides clues which had appeared in the preliminary discussion, the investigator asked more definite questions. The questionnaire given below was framed more to serve as a guide than to be submitted to the person interviewed, for it was early learned that the person to be approached would not be able to give satisfactory accounts merely by filling in a blank. An effort was made to ask questions which called for specific answers, and to frame them in language simple enough to be understood by the unlearned and untrained.

QUESTIONARY

I. ON ANGER.

1. Tell me about the occasions you can remember when he has been angry.
 - (1) What were the circumstances?
 - (2) How did he express his anger?
 - (3) How long did his anger last?
2. How does he usually express his anger? Does he ever fight when he is angry?
3. Does his anger die out quickly or slowly?
4. How often does he become angry?
5. Is he often quarrelsome or irritable?
6. How does he act when disciplined?
7. Is he ever angry without his anger being directed to any particular object? Give instances.
8. Have you ever noticed that fatigue and illness have any effect upon his readiness to anger? What effect?
9. Since you have known him has there been any change in (1) the frequency of his anger, and (2) the expression of his anger?

II. ON FEAR.

1. Tell me about the occasions you can remember when he has been afraid.
 - (1) What were the circumstances?
 - (2) How did he express his fear?
 - (3) How long, on these occasions, did his fear last?
2. How does he usually express his fear? Does he ever become violent when frightened?
 - (3) How long generally does his fear last?

4. How often does he become frightened?
5. Does he show fear in the presence of dangerous objects or in dangerous circumstances? Give instances.
6. Have you ever seen him afraid, or heard of his being afraid, of animals, insects, etc.?
7. Have you ever seen him fear the phenomena of nature such as wind, thunder, lightning, dark, etc.?
8. Has he ever to your knowledge shown fear of fire, moving vehicles, falling bodies, etc.?

III. ON AFFECTION.

1. Does he show affection? Toward whom?
 - (1) By what signs does he show his affection?
 - (2) How long does this show of affection last?
2. Does he have any special friends or companions among his fellows? Who are they?
 - (1) How does he show his friendship?
 - (2) How long does his friendship usually last?
3. Do you know that he has ever pretended to be fond of a person to gain an end in view? Give instances.
4. Is he generally kind and sympathetic toward his associates? Give instances.
5. Is he generous or selfish? Give instances.
6. Is he grateful for kindness shown him? How has he expressed his gratitude?
7. Does he seem to prefer companionship or solitude?

IV. ON HATRED AND REVENGE.

1. Has he ever shown clearly dislike or hatred toward anyone? Toward whom?
 - (1) What were the circumstances?
 - (2) How did he show his dislike?
 - (3) How long did it last?
2. Has he ever sought to 'get even' for something done against himself or another?
 - (1) What were the circumstances?
 - (2) What methods did he use?

V. ON JEALOUSY.

1. Do you know that he has ever shown jealousy?
 - (1) What were the circumstances?
 - (2) How did he show it?
 - (3) How long did it last?

OBSERVATIONS MADE UNDER ROUTINE CONDITIONS

A large part of the data was collected by myself by means of observation of the subjects' behavior in their usual surroundings. These observations were made at intervals over a period of two years, 1919-1920 and 1921-1922. I went among my subjects, attracting as little attention as possible—in the cottages and dormitories, at the places where they worked, at entertainments, parties, and games, and at school. All observations made in this way have been used as a control of information obtained by other methods.

EXPERIMENTAL

Experimentation is here a secondary method, not because its value was doubted, but because it seemed advisable to make detailed observations first, and later, using the information obtained in this way as a basis, to build up an experimental procedure. Accordingly certain experiments were finally performed with the hope of throwing more light upon the emotion of fear, since so few fear reactions were observed under ordinary conditions. Also some experimentation bearing upon affection was carried on. Some of these experiments will be described and the results presented in their proper places.

V. ANGER

The treatment of the data has been mainly statistical, but is supplemented by a brief non-statistical analysis. This seemed to be the most satisfactory method of reaching a comprehensive statement of the relationships involved.

Each case has been scored with respect to each of three aspects separately, namely, the frequency, the duration, and the intensity of anger. It seemed that three considerations of a person's expression of anger, each from a different viewpoint, would lead to a more reliable final score. However, as will appear later, it was not possible always to judge each aspect independently of the others. These scores for anger, and those for affection which

are treated in the next chapter, must rest for the present upon the writer's own judgment. For samples of the scoring the reader is referred to the typical cases cited with the scales which follow, and to the cases given in detail in the appendix.

By frequency is meant the number of times the emotion is observed in the subject's behavior within a given time, under the ordinary conditions of institution life; or it may be judged according to the usual length of the interval between the beginnings of the emotion in question. This necessarily represents a judgment which is based upon a comparison of a large number of cases, since it was impossible to ascertain the precise frequency of the expressions of the emotion. The sources from which indications of the frequency of the emotion may be drawn are: (1) records of the actual expressions of the emotions; (2) my own general, but fairly intimate, knowledge of the subject's personality, character, and conduct; (3) comparison with many other subjects.

Duration designates the length of time which usually elapses from the beginning of the expression of the emotion to the time when no after-effects can be observed. The precise factors considered in arriving at this estimate of the duration of the emotion are: (1) duration of those reactions and expressions which can be called the emotion itself; (2) duration of the after-effects as shown by the attitude toward the surroundings.

By intensity is meant the force or strength of the emotion, its height or depth, as judged upon the basis of the following factors: (1) clearness and definiteness of the reaction as a whole; (2) after-effects as shown in the general behavior.

The method of forming a scale for scoring these aspects of anger was as follows. First, all the cases were studied with a view to determining how many grades it seemed best to use, and it was decided that six grades would represent as many distinctions as could be made on the basis of the data at hand. Then each of the three aspects was studied throughout the group. The cases were first separated into three or four large groups which represented rough judgments of the aspect; and later, these

groups were analyzed for finer distinctions, until six fairly satisfactory groups were obtained. Each of these groups was then analyzed for common elements, and the corresponding step in the scale defined in terms of these. The resulting scales given below, together with two typical samples of each grade, are intended to be explanations of the way the present data have been treated, rather than as instruments to be used by others in their present form. The steps in each scale have been given numerical values from one to six for statistical purposes.

A. SCALE FOR GRADING FREQUENCY OF ANGER

Grade 1. No observable signs of anger in the subject's behavior.

Case 12.* Hol.J. (female), I.Q. 6, M.A. 10, A.A. 13. This child is a very low-grade idiot who reacts in no way which even remotely can be connected with the expression of anger.

Case 55. DeM.T. (female), I.Q. 20, M.A. 38, A.A. 17. DeM.T. is a low-grade imbecile who can feed and dress herself, and can perform such simple tasks as pushing a floor-polisher or leading another child. Never does she seem to have shown the least anger, nor does she resent anything that is done against her, indeed she is extremely docile, and indifferent to anger stimuli.

Grade 2. Expressions of anger are noted at wide intervals varying from one month to three or four months; usually not more than three or four times a year.

Case 10. Bro.I. (male), I.Q. 5, M.A. 10, A.A. 15. Bro.I. is a very slight, effeminate boy, able to walk about and feed himself, but does not perform any tasks. Once in two or three months one may observe some anger reactions in his behavior; especially if some habitual plaything is forcibly taken from him.

Case 69. Dav.M. (male), I.Q. 25, M.A. 48, A.A. 20. M. is an adult low-grade imbecile who is able to dress himself partly, to feed himself and to perform the simplest routine tasks. He has an insatiable curiosity, so that he often becomes a pest, and so is always being scolded and pushed away. Even so, reactions which indicate anger are noted in his behavior only two or three times a year.

* The abbreviations designate respectively the name, intelligence quotient, mental age (months), and actual age (years) of the subject. All information regarding the age and intelligence of each subject for this investigation, together with the scores given for anger, fear, and affection, is to be found in the appendices to the original manuscript which is deposited in the Library of the University of California.

Grade 3. Anger reactions occur once in a fortnight or once in a month.

Case 38. Pom.L. (male), I.Q. 13, M.A. 11, A.A. 6. L. is a middle-grade idiot child who is able to walk about and to feed himself, but does not talk. Almost the only stimulus that will arouse an anger response in him is to take from him the pile of trash with which he is playing. This occurs perhaps once a month.

Case 117. Ble.M. (female), I.Q. 48, M.A. 92, A.A. 26. This girl is a high-grade imbecile who is very capable at such tasks as sorting clothes or caring for small children. Not more often than once a month does she become irritable or actually angry, and then usually toward the children who may have been especially annoying, or toward an attendant who has scolded her.

Grade 4. Anger is observed about once a week; subjects are known neither as irascible nor as indolent, lifeless persons.

Case 167. Mea.L. (female), I.Q. 66, M.A. 127, A.A. 19. This girl is very stable in character and is a very capable worker. Generally her disposition is good, but she may become irritable or show definite anger about once a week.

Case 168. Col.J. (male), I.Q. 66, M.A. 127, A.A. 16. J. is a capable and willing worker, but is very difficult to discipline; is a strong leader, recognized as such by boys and attendants. It is usually on Saturdays when he is with a number of boys, as in a baseball game, that anger is observed in his behavior, caused almost without exception by the refusal or failure of some boy to carry out his commands.

Grade 5. Anger occurs at least once a day; subjects are irascible.

Case 61. Ash.W. (male), I.Q. 22, M.A. 42, A.A. 22. Ash.W. is a large boy, very capable for his degree of intelligence, but is unstable and irascible. At least once a day one may expect to find him engaged in a dispute or quarrel.

Case 184. Kan.L. (female), I.Q. 71, M.A. 136, A.A. 18. A very capable borderline girl who has a most expansive and self-assertive personality; is very lively, boisterous and disputatious. Being very irascible, something is sure to provoke anger in her every day.

Grade 6. Subjects become angry at the slightest provocation several times a day; extreme irascibility.

Case 147. Sch.I. (male), I.Q. 58, M.A. 111, A.A. 32. Sch.I. has a very bad temper, but he is so cowardly that his anger rarely leads him into difficulty. At any time of day one may find him swearing or sputtering at somebody or something.

Case 197. Aya.F. (female), I.Q. 76, M.A. 146, A.A. 16. This girl has a strong, but rather unstable and uncontrolled personality. Her temper is extremely bad, and frequent punishment seems not to mitigate it. Whenever she is with a group of girls, as at meals or in the evening, one may expect to find her quarreling.

B. SCALE FOR GRADING DURATION OF ANGER

Grade 1. No evidence of anger in the subject's behavior, hence no duration.

Case 12. Hol.J. (female), I.Q. 6, M.A. 10, A.A. 13. A very low-grade idiot whose behavior shows no expression of anger. (See scale A, 1.)

Case 55. DeM.T. (female), I.Q. 20, M.A. 38, A.A. 17. An extremely docile low imbecile girl whose behavior offers no indication of anger. (See scale A, 1.)

Grade 2. Duration of anger is from a few seconds to a minute.

Case 52. Car.S. (female) I.Q. 19, M.A. 36, A.A. 38. This woman cares for herself and performs simple tasks, and, although she cannot talk, uses some pretty good sign language. Anger is very rare in her behavior, and lasts about a minute, just long enough for her to utter several angry sounds, and probably slap the person who irritated her.

Case 69. Dav.M. (male), I.Q. 25, M.A. 48, A.A. 20. M.'s anger is momentary; he mumbles for a few seconds, may bite his own hand or wrist; nothing more. (See scale A, 2.)

Grade 3. Anger lasts only a few minutes, probably from two or three to fifteen.

Case 38. Pom.L. (male), I.Q. 13, M.A. 11, A.A. 6. When angry he cries out several times, perhaps flings his arms about for a few minutes, and may strike some one if he is near enough. The duration of the entire reaction is usually not more than ten or fifteen minutes. (See scale A, 3.)

Case 87. Rod.F. (female), I.Q. 32, M.A. 60, A.A. 17. This girl is able to feed and partly dress herself, walks with difficulty and talks a little. Any anger she may show is of short duration, not more than ten minutes; her usual performance is to bite herself on her arm or leg, and mumble in a low tone several times during the five or ten minutes following the first expressions of the emotion.

Grade 4. Duration is from several minutes to an hour or slightly more.

Case 76. Ava.L. (female), I.Q. 29, M.A. 35, A.A. 10. This little Mongolian imbecile usually speaks a few angry words and pouts for half an hour or so, but soon becomes interested in whatever the other little girls may be doing, and drops her peevishness.

Case 148. Bia.R. (male), I.Q. 60, M.A. 91, A.A. 12. A very erratic, unstable dwarf whose temper flares up frequently. Although the first outburst is over very shortly, he usually remains somewhat sulky and obstinate for half an hour or more.

Grade 5. Anger usually lasts several hours; the emotion so influences the subject's attitude and conduct that it is often necessary to reprimand him or to administer some other slight punishment.

Case 219. Fel.A. (female), I.Q. 85, M.A. 164, A.A. 20. This very capable, though unstable, dull normal girl has a slow but very uncontrolled and violent temper; a spell of anger will last for hours.

Case 154. Pre.M. (female), I.Q. 61, M.A. 118, A.A. 20. A rather unstable girl who pouts and mumbles for hours after the first rise of anger.

Grade 6. Anger lasts for several hours at least, but usually smoulders for a day or two, flaring up occasionally. The after-effects are often so great and so long continued that the subject must be locked in the detention room or subjected to some similar punishment.

Case 201. Dun.G. (female), I.Q. 77, M.A. 145, A.A. 21. When this girl becomes angry the expression is usually violent and of long duration; usually she must be taken into custody, or she will cause disturbances among the girls for several days.

Case 224. Fay.J. (female), I.Q. 91, M.A. 175, A.A. 16. After she has become angry she remains sullen for several days, even a week; says very little, but her attitude is very threatening.

C. SCALE FOR GRADING INTENSITY OF ANGER

Grade 1. No evidence of anger in the subject's behavior, hence no intensity.

Case 12. Hol.J. (female), I.Q. 6, M.A. 10, A.A. 13. A very low grade idiot whose behavior shows no evidence of anger. (See scale A, 1 and B, 1.)

Case 55. DeM.T. (female), I.Q. 20, M.A. 38, A.A. 17. An extremely docile low imbecile girl in whose behavior anger has never been observed. (See scale A, 1 and B, 1.)

Grade 2. Very little strength or depth to the emotion as judged from the expression which is not definite, and consists of nothing more than an angry sound perhaps, and a few movements of the arms and legs.

Case 82. Alb.M. (female), I.Q. 31, M.A. 60, A.A. 29. There is very little strength in this girl's anger reactions; just a few saucy words uttered mechanically and a lame slap or two with her hands, and there are no further signs of the emotion.

Case 7. Bra.C. (male), I.Q. 4, M.A. 8, A.A. 17. A very dull and apathetic idiot, who shows anger only when some direct stimulus acts upon him, as when a child takes from him something which he is grasping. He may frown and mumble in a low tone, or he may also strike out with arms and legs.

Grade 3. Expression of anger is usually clear and definite; movements of limbs are sometimes focussed; often some threatening facial expression as contraction of the eyebrows.

Case 8. Gro.E. (male), I.Q. 5, M.A. 10, A.A. 16. A very low-grade idiot, excitable most of the time, whose anger is usually a definite expression. At times the movements of his arms and legs seem to be purposeful, as when he strikes a child who annoys him, or when he covers up his mouth to avoid eating food that does not suit him.

Case 39. Fil.V. (female), I.Q. 13, M.A. 26, A.A. 32. This little Mongolian woman exhibits a stereotyped anger response when anything annoys her; large and energetic movements of the arms; will strike one if he is near enough, and may scream several times. As soon as this reaction is over there is no further evidence of anger.

Grade 4. The anger reaction is always clear and definite; its object is unmistakable; there are usually some words spoken in an angry tone, and the person is often sullen or obstinate and irritable afterward; never a violent reaction.

Case 137. Bia.M. (female), I.Q. 54, M.A. 89, A.A. 13. When angry, her face looks stormy, she makes some snappy and threatening remarks, and goes away to sulk for half an hour perhaps; never has a "tantrum."

Case 146. Bal.E. (female), I.Q. 58, M.A. 112, A.A. 19. She says very little when angry, usually refuses to speak to any one, but often writes harsh notes to the offending person or persons; nothing violent or pugnacious in her anger reactions.

Grade 5. Expression is definite and focussed; always loud, angry words, possibly flushing and trembling, may be some actual fighting; afterward either sulky or irritable and may hold a grudge.

Case 103. Abr.N. (female), I.Q. 43, M.A. 27, A.A. 5. Her spells of anger are very intense; she is mute, but will slap, bite, kick, pull hair, and her face looks very threatening. After being scolded and slapped she will sulk.

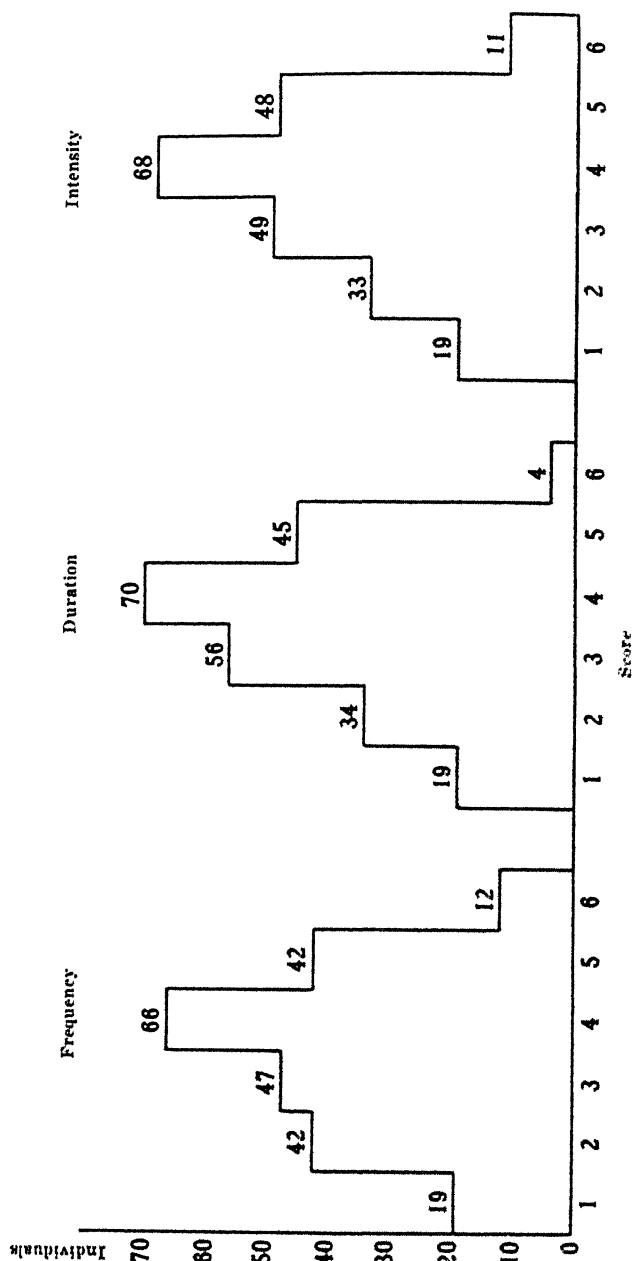
Case 102. Sut.G. (male), I.Q. 42, M.A. 82, A.A. 22. When he becomes angry he may fight, but always does much harsh talking, and holds a grudge for some time. His face becomes red, he stutters more than usual, and in his capacity of errand boy will perhaps refuse to serve the person who has angered him.

Grade 6. Violent rage, fighting, swearing, shouting, trembling; profound cardio-respiratory effects.

Case 224. Fay J. (female), I.Q. 91, M.A. 175, A.A. 16. This girl will fight if provoked when angry, and, in any case, is sullen for days and holds a deep grudge against the one who made her angry; she will "get even" later if possible, i.e., run away or steal something. (See scale B, 6.)

Case 219. Fel.A. (female), I.Q. 85, M.A. 164, A.A. 20. Although her spells of anger are quite infrequent, they are extremely intense; she will swear, pull hair, and beat the one at whom she is angry, and cannot be controlled by that person afterward. (See scale B, 5.)

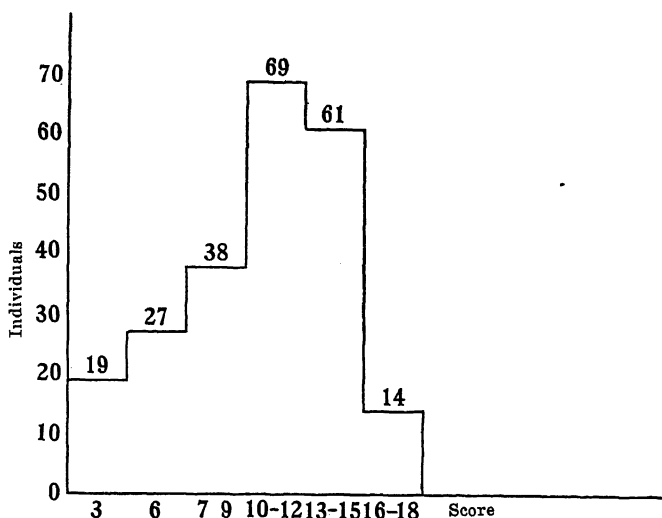
The distributions of the scores for the frequency, the duration, and the intensity of anger are shown in graph 3. All are skewed



Graph 3. Distribution of the Different Scores for Anger, with respect to its Frequency, Duration, and Intensity ($n = 228$).

in a similar manner, which is probably due to two factors: the relatively crude units, such as hours, days, weeks, and so on, which were used in estimating these qualities while the observations were being made; and the fact that there are relatively more subjects of low than of high intelligence, as is shown by the striking drop in the curve of mental ages. (See table 2.)

Since the units in each of the three scales have been chosen in such a way that corresponding scores have approximately the same weight, the sum of the three scores has been used as the final



Graph 4. Distribution of the Total Scores for Anger ($n=228$). Six Units on the Axis of the Abscissas are used to make the Curve comparable to those in Graph 3.

score for the emotion. The distribution of these total scores, which is given in table 3 and graph 4, shows a normal distribution above the two lowest steps. This large number of low scores is due to the failure to make any distinctions between frequency, duration, and intensity where no anger was observed, and fine distinctions where the expressions were very indefinite. It may be that there really are no distinctions to be made in the latter cases, or that the observations were not keen enough, and the measures not refined enough to detect them.

The high intercorrelations of the three aspects of anger (see table 6) indicate a tendency to give an individual the same score for all three aspects, and so disprove statistically any claim that frequency, duration, and intensity have been measured, each by itself, unless they are nearly the same. The correlation between duration and intensity is higher than the others because in some

TABLE 3

DISTRIBUTION OF TOTAL SCORES* FOR ANGER IN THE CONSTITUENT GROUPS AND IN THE ENTIRE GROUP

Group	SCORE															Total
	3	6	7	8	9	10	11	12	13	14	15	16	17	18		
Idiot	16	15		8	7	3	2		1						52	
Imbecile	3	11	5	3	6	9	7	5	9	5	3	1	1		68	
Moron					3	3	8	12	8	5	10	4	1		54	
Borderline		1			6	3	6	11	4	13	3	6	1		54	
Total	19	27	5	11	22	18	23	28	22	23	16	11	3		228	

TABLE 4

DISTRIBUTION OF CONSTITUENT SCORES FOR ANGER IN THE FOUR GROUPS

Group	Score	1	2	3	4	5	6	Total
Frequency—								
Idiot		16	22	8	2	4		52
Imbecile		3	19	21	11	11	3	68
Moron				9	24	14	7	54
Borderline			1	9	29	13	2	54
Duration—								
Idiot		16	17	18	1			52
Imbecile		3	16	16	23	10		68
Moron				10	26	17	1	54
Borderline			1	12	20	18	3	54
Intensity—								
Idiot		16	17	17	1	1		52
Imbecile		3	15	16	18	15	1	68
Moron				6	27	18	3	54
Borderline			1	10	22	14	7	54

* The absence of total scores of 1, 2, 4, and 5 is due both to the nature of the data and to the treatment of them. Where no evidence of anger is noted the score for each of the three aspects is 1 (that is, none of the aspect), making a total score of 3. If anger appears, the score for each of the three aspects is at least 2, making a total score of 6, since one of these aspects cannot exist without the others being present in some degree. The same peculiarity appears in table 11 in the chapter on affection, and is to be explained in the same way.

cases we judged intensity partly by duration. The distributions of the scores for these aspects (see table 4) show the same thing. Further, the fact that the correlations of these aspects with I.Q., with mental age and with actual age are very nearly the same, and that they approach the correlation with the total scores for anger, points out the same tendency. (See table 7.)

TABLE 5

MEANS AND STANDARD DEVIATIONS OF THE DISTRIBUTIONS USED IN COMPUTING CORRELATIONS, WHERE $n = 228^*$

Distribution	Mean	S.D.
I.Q.	44.83	26.08
Mental age	77.97	49.48
Actual age	20.53	12.45
Anger, total score	10.46	3.67
Frequency	3.47	1.34
Duration	3.44	1.24
Intensity	3.55	1.32
Affection, total score	10.15	4.17
Frequency	3.38	1.49
Duration	3.37	1.45
Intensity	3.40	1.51

TABLE 6

INTERCORRELATIONS OF THE ASPECTS OF ANGER AND OF AFFECTION ($n = 228$)

	Anger		Affection	
	r	P.E.	r	P.E.
Frequency with duration.....	.79	.017	.80	.016
Frequency with intensity.....	.79	.017	.76	.019
Duration with intensity.....	.90	.009	.89	.009

* The statistical treatment of these data has been supervised by Raymond H. Franzen. The following crude-score formula derived from the Pearson formula was used in computing all correlations. (See his "Two Notes on Statistical Method," *Journal of Educational Psychology*, vol. 15, p. 250.)

$$r = \frac{\frac{\sum XY}{n} - M_x M_y}{\sqrt{\frac{\sum X^2}{n} - M_x^2} \sqrt{\frac{\sum Y^2}{n} - M_y^2}}$$

The formula for computing the P.E. is $.67449 \frac{1 - r^2}{\sqrt{n}}$

TABLE 7

CORRELATIONS OF ANGER WITH I.Q., WITH MENTAL AGE, AND WITH ACTUAL AGE ($n = 228$)

	I.Q.		M.A.		A.A.	
	<i>r</i>	P.E.	<i>r</i>	P.E.	<i>r</i>	P.E.
Anger, total score .....	.67	.025	.63	.027	-.007	.04
Frequency .....	.59	.029	.55	.031	.008	.04
Duration .....	.72	.021	.64	.027	.024	.04
Intensity .....	.59	.029	.60	.028	-.051	.04

TABLE 8

MEANS AND STANDARD DEVIATIONS OF THE DISTRIBUTIONS USED IN COMPUTING CORRELATIONS ($n = 99$; SUBJECTS 16 YEARS OF AGE, OR LESS)

Distribution	Mean	S.D.
I.Q.	43.12	26.74
Mental age	63.99	46.83
Actual age	11.51	3.47
Anger, total score	10.16	3.68
Affection, total score	9.48	4.22

TABLE 9

CORRELATIONS OF ANGER WITH I.Q., WITH MENTAL AGE, AND WITH ACTUAL AGE ($n = 99$; SUBJECTS 16 YEARS OF AGE, OR LESS)

	I.Q.		M.A.		A.A.	
	<i>r</i>	P.E.	<i>r</i>	P.E.	<i>r</i>	P.E.
Anger, total score .....	.70	.034	.63	.041	.11	.05

Although the foregoing facts prove the existence of a "halo" in the scoring of frequency, duration, and intensity, and indicate that these aspects have not been measured independently, at the same time these very facts do not reduce the reliability of the total scores for anger, which was the point aimed at from the first.

Let us now turn to the correlations of I.Q. and mental age with the final scores for anger, to see what they show regarding the expression of the emotion of anger in persons of defective intelligence, as judged from these data. The correlations (when

$n=228$) of anger with I.Q. (intelligence, with actual age rendered constant) and with mental age expressed in months, are nearly the same, being .67 and .63 respectively (see table 7). Computing these correlations for those individuals 16 years of age or less, we get similar figures, .70 and .63 (see table 9). These coefficients indicate a fairly high positive correspondence between the expression of anger and the degree of intelligence.

The distributions of the scores for the three aspects in the constituent groups show clearly in another way the relationship expressed by the correlations, for the scores tend to become larger as intelligence increases, although there is considerable overlapping of the distributions (see table 4). The same tendency appears in the distributions of the total scores for the four groups (see table 3). It is evident from these distributions that a division of the subjects into four groups is purely arbitrary, although we can make fairly clear distinctions between the lower and the higher grades as between idiots and "borderlines."

These data show no relation between the expression of anger and actual age, for the correlations approach zero, and the probable errors are very large, both for the entire group of 228, and for those 16 years of age or less (see tables 7 and 9). However, it is possible that this result is due to some peculiarity in these data or in the treatment of them, and that a definite relationship, either positive or negative, might be discovered through further investigation.

This positive correlation of about .65 between anger and intelligence indicates a general tendency only, and therefore does not mean that an individual's expression of anger can be predicted without error from his mental age or his I.Q., for there are many exceptions. In table 10 are given certain indices, computed upon the basis of the correlation between anger and I.Q. ($r=.67$), which can be interpreted upon the basis of table 51 in Thorndike's *Mental and Social Measurements* to show the probable frequency of each case in a hypothetical distribution of 10,000 cases. The prediction may be made either from the I.Q. or from the anger score. The cases cited have been selected so

that some of them show a positive correspondence between the degree of intelligence and the expression of anger, while others are unusual cases that occupy very different positions in the two distributions. In the accounts which follow, an attempt has been made to show why these individuals occupy their respective positions in the two distributions.

Case 53 is below the mean of the distribution of the I.Q.'s ($- .95$ of the S.D.), but is above the mean of the distribution of the anger scores ($+ .96$ of the S.D.). In a distribution of 10,000 cases that have an anger score of 14, about 150 only would have an I. Q. of 20 or lower, and predicting from 10,000 cases having an I.Q. of 20, about the same number, 150, would have an anger score of 14 or higher. This individual is a girl about 19 years of age, who received the low I.Q. of 20, more, probably, because of a marked instability than because of pure lack of mental ability; for she is a more capable worker than most individuals having the same I.Q. But she is liable to frequent irritable spells, when she shows violent anger. These reactions last for about an hour, and then all is over; she does not hold a grudge.

TABLE 10

PREDICTION INDICES* FOR A FEW CASES COMPUTED ON THE BASIS OF THE CORRELATION BETWEEN ANGER AND I.Q.

Case No.	I.Q.	Anger total score	Anger constant	I.Q. constant
5	3	3	-0.32	-1.29
34	12	13	-2.33	2.08
53	20	14	-2.16	2.17
77	29	3	1.02	-2.19
117	48	10	0.28	-0.28
126	51	17	-1.30	2.19
139	55	9	0.98	-0.89
142	57	16	-0.74	1.62
166	66	11	0.96	-0.54
219	85	14	1.20	-0.09
224	91	17	0.77	0.80
227	95	6	3.70	-3.39

* The formula used for computing these indices and those given in Table 15 is as follows:

$$\frac{x}{\sigma x} - r \frac{y}{\sigma y}$$

$$\sqrt{1 - r^2}$$

The indices are interpreted on the basis of table 51 in E. L. Thorndike, *Mental and Social Measurements*, 1919.

Case 227 is a man of 45 years whose I.Q. of 95 gives him a place in the dull normal group according to the usual classification ($+1.92$ of the S.D.), but he has been given an anger score of 6, out of a possible 18 (-1.21 of the S.D.). Only 2 cases in 10,000 with an anger score of 6 would have an I.Q. of 95 or higher, and only 5 cases in 10,000 with an I.Q. of 95 would have an anger score of 6 or lower. This man helps in the care of some of the young children but is not very capable. He is forgetful and extremely lifeless, and is indifferent to almost any amount of teasing, nagging or scolding.

Case 224 has an I.Q. of 91, which is above the mean of the distribution ($+1.77$ of the S.D.), and has an anger score of 17 which also is above the mean of this distribution ($+1.78$ of the S.D.). In other words, her position in both distributions is nearly the same. In 10,000 cases having an I.Q. of 91, about 2100 would have an anger score of 17 or more; and in 10,000 having an anger score of 17, about 2300 would have an I.Q. of 91 or higher. Fay.J. is a girl 16 years of age, who appears quite normal, and is a capable worker, but has a very sullen disposition. She is not a "spitfire," but she does become angry quite easily, and usually her reaction is violent and long-continued, especially if she is punished or thwarted in her purposes.

The causes of anger which appear in each of the four groups are given below, together with the number of cases in which each occurs, irrespective of the number of times it occurs; also, the number of cases is expressed in terms of percentage of the total number of cases in the group. In this classification many slight differences in the causes have been obscured, but it seemed that the essential points would be brought out more clearly by a concise presentation.

CAUSES OF ANGER

In idiots (total, 52).

Causes—	No. of cases	Per cent of cases
1. Being teased or 'picked at'; for example, being pinched, pushed etc.	12	23
2. Interference with movements of body or limbs....	8	14
3. Food disagreeable to them	7	13
4. Treatment disagreeable to them, as being bathed, having hair cut, etc.	6	11
5. Having something taken from them	6	11
6. Failure to get something that they desire, as a toy	2	4
7. Being scolded or punished	2	4
8. Failure to receive the accustomed amount of attention	1	2

In imbeciles (total, 68).

Causes—	No. of cases	Per cent of cases
1. Being teased, or 'picked at,' etc.	26	38
2. Being scolded or punished	15	22
3. Having purposes thwarted	11	15
4. Having something taken from them	10	14
5. Interference with their work, as changing it, or giving them more to do	7	10
6. Failure to get something that they desire	5	7
7. Disobedience of smaller children	3	4
8. Interference with movements of the body or limbs	2	2
9. Failure to receive the accustomed amount of attention	2	2
10. Being commanded by inmates	1	1

In morons (total, 54).

Causes—	No. of cases	Per cent of cases
1. Being reprimanded or punished	17	31
2. Quarreling and disputing. (These are occasions of anger where the specific cause is not known)	14	26
3. Having purposes thwarted	12	22
4. Being teased, or 'picked at,' etc.	11	20
5. Failure to receive the accustomed amount of attention	5	9
6. Being kept at Eldridge	4	7
7. Being compelled to do what they do not wish to do	4	7
8. Failure to get something that they desire	3	5
9. Having something taken from them	1	2

In "borderlines" (total, 54).

Causes—	No. of cases	Per cent of cases
1. Being reprimanded or punished	16	29
2. Having purposes thwarted	13	24
3. Being teased, or 'picked at,' etc.	10	18
4. Quarreling and disputing	9	16
5. Being compelled to do what they do not wish to do	4	7
6. Failure to receive the accustomed amount of attention	4	7
7. Meddling with their personal possessions	3	5
8. Insulting remarks made about a friend	2	3
9. Cheating or unfairness in a game	2	3
10. Being kept at Eldridge	2	3
11. Being associated with "low-grades"	2	3
12. Having something taken from them	1	2
13. Disobedience of younger children	1	2

Two principal factors have determined that these should be the causes of anger: first, the differing environments in which the subjects lived, and hence the differing stimuli that acted upon them; and second, the degree of intelligence. There is an interaction here, for the environment in which a person is kept is closely connected with his ability, and hence with his intelligence. An idiot would not become angry because his work was changed, since he is not capable of performing a variety of tasks.

The causes of anger in idiots have to do largely with their physical being; for example, interference with movements of the body and limbs, or food that does not please them. In the imbecile group we note such causes as thwarting of purposes and interference with work. In the moron and borderline groups we find anger in quarrels, resentment at being kept at Eldridge and at being associated with 'low-grades,' anger at someone's cheating in a game and at insulting remarks made about a friend. To be sure, the distinctions between contiguous groups are not clear-cut, but if we compare the idiot with the moron or borderline group the differences are very marked.

By referring to the scales for the three aspects of anger and to the distributions of the constituent and total scores within the four groups, it is possible to summarize the usual expression of anger for each of these groups. (See scales A, B, C for anger; tables 3, 4.)

Among the idiots, expression of anger is very infrequent, usually not more often than once in 3 or 4 months, and its duration is rarely longer than fifteen minutes. In many of these low-grade individuals the expression is indefinite and consists merely of an angry sound and a few movements of the arms and legs. In other cases the expression is clear and definite; there may be a threatening facial expression, and the movements of the limbs may be directed to some object. On the whole the emotion of anger in idiots is infrequent, is of short duration, has little strength, and after-effects are almost never observed.

Some evidence of anger has been noted in almost all of the imbeciles, but there is much variation in the amount of each of the three aspects. This wide variation may be explained partly by the greater spread in I.Q. of the imbecile group—a spread of 30 points as compared to 20 points in the idiot and moron groups (see table 7); and partly by the greater number of individuals in this group—68 imbeciles, as compared to 52 idiots, 54 morons, and 54 “borderlines.” The frequency of the expressions varies from once in several months to once a day, and the duration from a few seconds to several hours. The character of the expression itself varies from the indefinite type found in the idiot group to a near-violent demonstration. Usually, however, it is a definite expression, but not extremely intense: the object is unmistakable; angry words are spoken; there are offensive movements of the limbs; and after-effects, such as sulkiness and irritability are common.

There is less variation in the expression of anger in the moron group than in the imbecile group: its frequency varies from once a week to once a day; its duration from a few minutes to several hours, but usually it is about an hour; and the expression itself is always a clear and definite reaction, usually of pretty high intensity, and at times is extremely intense, even violent. There are angry words spoken, and a marked facial expression, such as flushing and scowling; there may be trembling of the body, and there are instances of actual fighting; and after-effects which last for hours are almost always noted.

The expression of anger in the moron and borderline groups is very similar: the usual frequency and duration are about the same, and so are most of the constituent elements in the expression of the emotion. There is in the borderline group, however, a greater frequency of extremely violent demonstrations of very long duration, where the angry behavior continues for several days and the individual may have to be taken into custody. These extremely violent and uncontrolled reactions are found only in the moron and borderline groups.

In 22 cases we find a kind of behavior which may be termed unfocussed anger. It resembles a violent expression of anger, but has no apparent cause and seems not to be directed to any particular object. Of these cases, 21 have I.Q.'s below 30, and the other, an I.Q. of 46. The behavior in this single case may be explained by the fact that he is subject to mild epileptic attacks. It would seem that this type of behavior is usually found in the low grades of mental defect, and probably should not be classed as anger, but considered to be a general disturbance, largely motor, of uncertain origin.

Those complex emotional states which are akin to anger—jealousy, hatred, and revenge—appear very infrequently. Jealousy is not found below I.Q. 40. There are two occasions when it may appear: one, when a third person shows too much attention to a person of whom an individual is very fond; and when an individual fails to receive the attention that is given to another. The jealousy does not take a violent form, but is shown by the use of harsh language, or a general attitude of sulkiness or irritability. No indications of enduring hatred or acts of revenge have been noted in this group. The behavior most resembling these is definite dislike, and even this dies in a short time. The 'low-grades' show their dislike in a negative way: they refuse to be fed or dressed, etc. Those of higher grade manifest dislike for persons who have teased them or beaten them in fights; they will refuse to associate with the offending person and are apt to make insulting remarks about him. Among the morons and in the borderline group, strong attachments are apt to change into intense dislikes of short duration.

VI. AFFECTION

On the whole, the treatment of the data pertaining to affection has been the same as that explained in the preceding chapter on anger. Each case has been scored with respect to the frequency, the duration, and the intensity of the emotion, separately, these aspects being judged upon the same bases as in the case of anger.

Essentially the same analytical procedure has been employed in forming the scales. It proved to be more difficult, however, to form the scales for affection because the expressions of the emotion are not so definite as those of anger, nor is the stimulus always specific. The frequency was quite readily analyzed into its several degrees as they appear in these data, but when it came to scaling the duration, two somewhat different aspects had to be considered before a complete scale could be formed. In the lower degrees of duration only the length of time that the specific expressions of affection continue can be considered. A point is soon reached, however, about grade 4, where the specific expressions do not appear to increase in duration, but another factor enters, namely, attachments between persons which last a longer or shorter time. The duration of these attachments has been analyzed to form the last three steps in the scale of duration. The intensity of the emotion was not so baffling for a scale could be formed on the basis of cumulative expression as was done in the case of anger.

The resulting scales, with two illustrative cases for each grade are given below.

A. SCALE FOR GRADING FREQUENCY OF AFFECTION

Grade 1. No evidence of affection.

Case 24. Pre.M. (female), I.Q. 10, M.A. 9, A.A. 7. M. is a very apathetic idiot whose behavior offers no evidence that she experiences any emotion.

Case 54. Sel.L. (male), I.Q. 20, M.A. 38, A.A. 20. For a middle-grade imbecile this boy is very dull and unresponsive; no expressions of affection have been noted in his behavior.

Grade 2. Indications of affection are observed very infrequently probably once in a period of three or four months.

Case 21. War.L. (male), I.Q. 8, M.A. 11, A.A. 11. Although he is a low-grade idiot, L. has been known to come up to a person and smile and pat him with his hands.

Case 97. Ram.J. (male), I.Q. 40, M.A. 77, A.A. 17. This is a very silly imbecile boy who expresses something like affection at wide intervals, and then only a smile or nod when some attention is shown him.

Grade 3. Some expressions of affection may be noted every few days or once a week.

Case 128, Slo.M. (female), I.Q. 51, M.A. 98, A.A. 18. This girl is usually so irascible that once a week is probably as often as she is in the proper mood for showing affection toward those of whom she may be fond.

Case 174, Tom.J. (female), I.Q. 69, M.A. 133, A.A. 54. Although this woman's general attitude and conduct show that she is fond of children she takes care of, specific expressions of her affection are not observed more than once in several days.

Grade 4. About once a day, these subjects may be expected to express their tender feeling for certain persons.

Case 92, Bar.C. (male), I.Q. 35, M.A. 33, A.A. 7. This little imbecile boy sometimes comes to an attendant to be petted and held in her lap, and has been seen caressing the smaller children. Such expressions probably occur about once each day.

Case 186, Kel.G. (female), I.Q. 72, M.A. 137, A.A. 25. An irascible, unsociable young woman usually, but she never lets a day pass without showing her regard for her particular chum.

Grade 5. Expressions of affection may be observed several times a day.

Case 76, Ava.L. (female), I.Q. 29, M.A. 35, A.A. 10. This little girl usually responds to kind words or caresses, and several times a day one may observe her making some expression of regard for another child or an attendant.

Case 148, Bia.R. (male), I.Q. 60, M.A. 91, A.A. 12. A very friendly sociable little dwarf who never passes a day without showing by a kindly pat or by the performance of some task that he cares for some of his fellows and attendants.

Grade 6. Excessive frequency of expressions of affection: at any hour of the day the subject may be observed showering endearing terms, caresses, or gifts upon someone.

Case 214, Mar.T. (female), I.Q. 82, M.A. 157, A.A. 18. This girl is given to forming attachments to several persons at a time, and is very demonstrative in her expressions of affection. Usually she manages to be near at least one of the attractive persons.

Case 48, Oli.S. (female), I.Q. 17, M.A. 34, A.A. 46. This little Mongolian woman is very demonstrative in her affection; almost at any time she may be seen putting and talking to a person who is attractive to her.

B. SCALE FOR GRADING DURATION OF AFFECTION

Grade 1. No evidence of affection, hence no duration.

Case 28. Mor.A. (male), I.Q. 11, M.A. 19, A.A. 14. A. is a paralytic idiot who neither responds to attention nor shows any affection for any person or any thing. He has a very stolid look, and makes few reactions of any kind.

Case 30. Hin.L. (female), I.Q. 11, M.A. 11, A.A. 8. L. is a low-grade idiot child who does not respond to attention of any kind.

Grade 2. Duration of the expressions is very brief, from a few seconds to a minute perhaps; just a glance, smile or nod.

Case 19. Nob.H. (female), I.Q. 8, M.A. 15, A.A. 22. H. is an idiot girl who can perform very simple tasks. She will respond with a smile to putting or kind words from any one.

Case 204. Ton.G. (male), I.Q. 79, M.A. 152, A.A. 16. This boy is not friendly, never shows affection spontaneously, but may respond with a smile or "thank you!" if something is done for him or given to him.

Grade 3. The affectionate behavior has considerable duration, from a few minutes to three or four hours.

Case 42. Can.L. (female), I.Q. 14, M.A. 27, A.A. 31. This friendly idiot woman will follow one around for several hours if allowed to do so; will talk, pat, and do little things for one.

Case 191. Lew.E. (male), I.Q. 73, M.A. 105, A.A. 12. E. is not a sociable boy, but he will respond to attention by conversing in a friendly way, or by performing some task.

Grade 4. The specific affectionate behavior probably lasts no longer than in grade 3, but there are definite attachments which last from several days to two or three weeks.

Case 146. Bal.E. (female), I.Q. 58, M.A. 112, A.A. 19. This girl's intense attachments to associates or officers usually last no longer than two weeks.

Case 139. Con.J. (male), I.Q. 55, M.A. 95, A.A. 14. J. is very good-natured and has many friends who vary in his favor—now one, now another holds first place in his regard.

Grade 5. Attachments last from a few weeks to several months.

Case 154. Pre.M. (female), I.Q. 61, M.A. 118, A.A. 20. M.'s attachment to a certain person may continue for several months, provided some decided difference does not arise between them.

Case 220. Mar.H. (female), I.Q. 85, M.A. 164, A.A. 25. This girl's affection is inconstant; a most intense attachment may last only a few weeks, but may continue for several months.

Grade 6. Affection promises to be enduring; it survives petty differences, time, and separation.

Case 219. Fel.A. (female), I.Q. 85, M.A. 164, A.A. 20. A.'s affection is enduring and constant; she has few friends, but is true to them.

Case 216. Lon.J. (female), I.Q. 83, M.A. 160, A.A. 34. This woman's affection seemed to be genuine, and her friendship enduring.

C. SCALE FOR GRADING INTENSITY OF AFFECTION

Grade 1. No indications of affection in the subjects' behavior, hence no intensity.

Case 28. Mor.A. (male), I.Q. 11, M.A. 19, A.A. 14. No expressions of affection have been observed in this child's behavior. (See scale B, 1.)

Case 86. O'G.M. (female), I.Q. 32, M.A. 62, A.A. 23. Although this girl has an I.Q. of 32, she appears very stupid, and can perform only the simplest tasks. None of her behavior has indicated a feeling of affection. If she is spoken to kindly or is given some trifle, she will look at the person who has shown her attention, but she will do the same thing if she is scolded.

Grade 2. The very least feeling of affection; usually shown by a brightened glance or smile in response to some specific attention; usually indiscriminate and passes in a moment.

Case 19. Nob.H. (female), I.Q. 8, M.A. 15, A.A. 22. H. responds with a smile if patted or spoken to kindly, but never shows affection voluntarily. (See scale B, 2.)

Case 129. Han.J. (male), I.Q. 51, M.A. 99, A.A. 23. Although Han.J. is a moron, he shows very little affection; he has no friends and rarely associates with his fellows, and if he receives any attention or a gift, he will probably smile and utter a colorless "thank you!"

Grade 3. There is not only a smile, or a few words in response to direct attention, but also some spontaneous show of affectionate feeling as in caressing or possibly doing some slight thing for another. There may be attachments formed but they are usually weak and indiscriminate.

Case 65. Von.T. (male), I.Q. 24, M.A. 40, A.A. 13. This little Mongolian is friendly to anyone, sometimes puts other children and seems to enjoy being with others.

Case 116. Col.R. (female), I.Q. 47, M.A. 90, A.A. 28. This girl is most indiscriminate and flighty in her affection; is friendly to almost anyone, and will offer to do things for people, but seems not to care for anyone in particular.

Grade 4. The subjects not only express a definite appreciation of attention shown them, but they show clearly affection for relatives and friends by a desire to be with them to caress and do for them. The emotion is not indiscriminate.

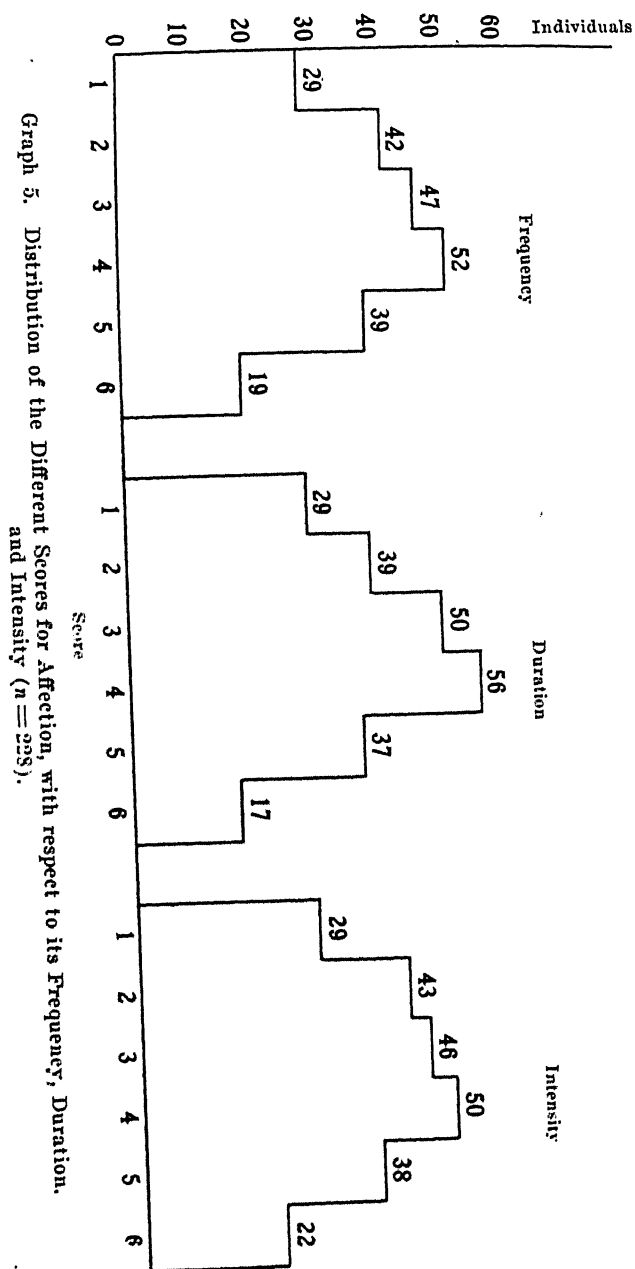
Case 156. Kin.L. (male), I.Q. 61, M.A. 101, A.A. 13. L. is very friendly, and although he has no special chums, he does show a real pleasure in associating with and doing for some of the boys and attendants.

Case 173. Mof.M. (female), I.Q. 69, M.A. 133, A.A. 24. This pleasant, friendly girl enjoys being in the company of some of the girls and attendants, talks with them, caresses them, and may do or make something for them.

Grade 5. The subjects form very strong attachments to children, attendants, or relatives, and show their feeling by association with them, and by a great deal of caressing.

Case 149. Pro.E. (female), I.Q. 60, M.A. 114, A.A. 21. E. was very fond of the members of the family where she worked. She would hardly leave the children, and was very jealous of attention shown the lady of the house.

Case 174. Tom.J. (female), I.Q. 69, M.A. 133, A.A. 54. This woman is sociable in a quiet way and really loves the children under her care. When her especial little pet died she showed real grief.



Graph 5. Distribution of the Different Scores for Affection, with respect to its Frequency, Duration, and Intensity ($n = 228$).

Grade 6. Intense and at times uncontrolled attractions toward persons of the same or of the opposite sex: there is an ever-present desire to be with the beloved person, to shower gifts and caresses upon him, and even to wait upon him at every turn.

Case 181. Cal.M. (female), I.Q. 71, M.A. 136, A.A. 24. This girl is not indiscriminately sociable, but does become passionately attached to people. She must be near the beloved person, will do almost anything for her, and will hasten to protect her from insulting remarks.

Case 208. Teh.J. (male), I.Q. 81, M.A. 79, A.A. 8. A very affectionate little boy who loves his "foster parents," is very fond of several boys, and is delighted by pets of all kinds.

The distributions of the scores for the three aspects of affection are presented in graph 5. The steps in these scales are not so clearly defined as those in the scales for anger, which is shown by the flatter curves and the smaller differences between adjacent steps. This is probably due to the reason stated above, namely, that the expressions of affection are not so clear-cut as those of anger, and, consequently, fine distinctions are made with greater difficulty. The uniform skew is probably due to the same factors that seemed to account for the skew in the curves for anger, namely, the crude units of measurement and the relatively greater number of persons of low intelligence (see graph 1).

Since these scales have been formed so that corresponding scores on the three scales have approximately the same weight, the sum of the three scores has been used as the final score for affection. The distribution of the latter scores is given in table 11 and graph 6. The relatively large number of scores 3 and 6 is due, as in the case of anger, to a failure to make fine distinctions where there was little or no evidence of affection.

Here, as in the case of anger, the statistical results indicate that the three aspects of affection have not been measured, each as a separate thing, unless they actually do enter into a subject's entire expression of affection to very nearly the same degree. The intercorrelations of these aspects are very high, since all approach .80 (see table 6). Also, these aspects correlate similarly with

TABLE 11

DISTRIBUTION OF TOTAL SCORES FOR AFFECTION IN THE CONSTITUENT GROUPS
AND IN THE ENTIRE GROUP

Group	SCORE															Total
	3	6	7	8	9	10	11	12	13	14	15	16	17	18		
Idiot	23	11	7	5	1	1	1	1	2						52	
Imbecile	6	12	6	5	5	3	13	6	3	5	3		1		68	
Moron		2	1	1	5	7	8	6	5	4	6	8	1		54	
Borderline			1	1	3	3	3	10	5	3	7	13	4	1	54	
Total	29	25	15	12	14	14	25	23	15	12	16	21	6	1	228	

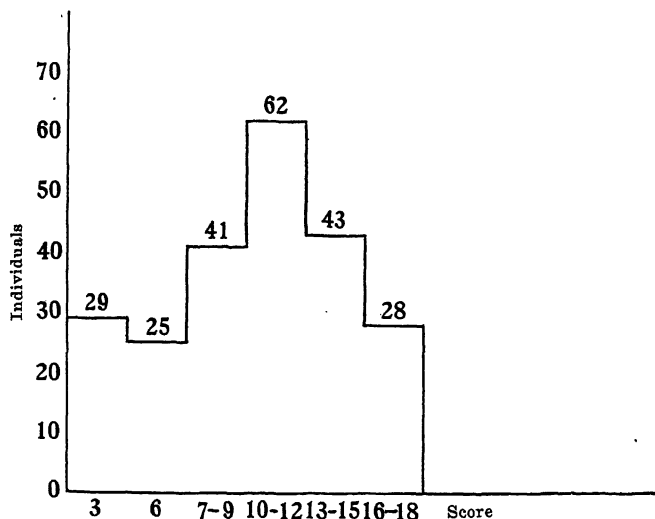
TABLE 12

DISTRIBUTION OF CONSTITUENT SCORES FOR AFFECTION IN THE FOUR GROUPS

	SCORE						
Group	1	2	3	4	5	6	Total
Frequency—							
Idiot	23	17	7	2		3	52
Imbecile	6	21	10	14	14	3	68
Moron		2	19	18	10	5	54
Borderline		2	11	18	15	8	54
Duration—							
Idiot	25	17	9	3			52
Imbecile	6	18	18	17	8	1	68
Moron		3	14	19	11	7	54
Borderline		1	9	17	18	9	54
Intensity—							
Idiot	25	20	7	2			52
Imbecile	6	18	24	13	7		68
Moron		4	9	21	15	5	54
Borderline		1	6	14	16	17	54

I.Q., with mental age, and with actual age (see table 13). The striking similarity between the scores for the three aspects in each of the four groups of subjects, no doubt, indicates a tendency to give an individual a like score for all three aspects (see table 12). Nevertheless, all the foregoing facts do not reduce the reliability of the final scores for affection.

Upon the basis of the data from the entire group ($n=228$) the correlation of affection with I.Q. is .73, and with mental age,



Graph 6. Distribution of the Total Scores for Affection ($n=228$). Six Units on the Axis of the Abscissas are used to make the Curve comparable to those in Graph 5.

.69 (see table 13). For those subjects 16 years of age or less ($n=99$) the correlations are respectively .72 and .62 (see table 14). Although these correlations tend to be slightly higher than the corresponding correlations with anger, it is difficult to say whether the difference is significant.

The distributions of the constituent scores and of the total scores in the four groups (idiot, etc.) show the same relationship between intelligence and the expression of affection as has been indicated by the coefficients of correlation (see tables 11 and 12).

No significant correlation is found between affection and actual age either in the entire group or in those 16 years of age

or less. The coefficients approach zero, while the probable errors are very large (see tables 13 and 14).

A discussion of a few subjects will show the discrepancy that is sometimes found between the expression of affection and the degree of intelligence, expressed in terms of I.Q. The method of determining the position of an individual in the distributions is the same as that used with respect to anger (see page 103).

TABLE 13

CORRELATIONS OF AFFECTION WITH I.Q., WITH MENTAL AGE, AND WITH ACTUAL AGE ($n=228$)

	I.Q.		M.A.		A.A.	
	<i>r</i>	P.E.	<i>r</i>	P.E.	<i>r</i>	P.E.
Affection, total score .....	.73	.021	.69	0.17	.006	.045
Frequency .....	.58	.030	.55	.031	.008	.045
Duration .....	.71	.022	.66	.026	.007	.045
Intensity .....	.77	.019	.74	.020	.003	.045

TABLE 14

CORRELATIONS OF AFFECTION WITH I.Q., WITH MENTAL AGE AND WITH ACTUAL AGE ($n=99$; SUBJECTS 16 YEARS OF AGE, OR LESS)

	I.Q.		M.A.		A.A.	
	<i>r</i>	P.E.	<i>r</i>	P.E.	<i>r</i>	P.E.
Affection, total score .....	.72	.032	.62	.042	.061	.068

TABLE 15

PREDICTION INDICES FOR A FEW CASES COMPUTED ON THE BASIS OF THE CORRELATION BETWEEN AFFECTION AND I.Q.

Case No.	I.Q.	Affection, total score	Affection constant	I.Q. constant
3	2	3	-0.57	-0.75
42	14	13	-2.46	2.26
54	20	3	0.44	1.49
76	29	14	-1.87	2.00
115	47	11	-0.10	0.21
120	49	17	-1.52	2.23
140	55	17	-1.18	1.98
142	57	6	1.75	-1.95
152	60	11	0.63	-0.32
204	79	7	2.72	-2.50
206	80	16	0.48	0.61
212	82	18	0.08	1.23
227	95	15	1.57	-0.36

Case 76 is a little Mongolian girl 10 years of age. She is below the mean of the distribution of I.Q.'s ($-.61$ of the S.D.), but is above the mean of the distribution of affection scores ($+.92$ of the S.D.). In a distribution of 10,000 cases having an affection score of 14, only 300 would have an I.Q. of 29 or lower, and predicting from 10,000 cases having an I.Q. of 29, about 230 would have an affection score of 14 or higher. The difference between the positions of this individual in the distributions of the I.Q.'s and of the affection scores is probably to be explained by the fact that she is a Mongolian, for this type of mental defective is usually very affectionate.

Case 204 occupies widely divergent positions in the distributions of affection scores ($-.75$ of the S.D.) and of the I.Q.'s ($+1.31$ of the S.D.), but the situation here is just the reverse of the case discussed above; here there is a low affection score (7) with a high I.Q. (79). In the assumed distribution of 10,000 cases having an affection score of 7, only 34 cases would have an I.Q. of 79 or higher; and predicting from his I.Q. of 79, one finds that there would probably be 62 cases having an affection score of 7 or lower. This 16-year-old boy is not sociable, has no particular friends, and has been observed to show affectionate behavior only at times when something had been done for him or given to him.

Case 206 occupies very similar positions in both distributions; in a very large distribution such a case would have a high frequency. In general, she is a very friendly, sociable young woman, and is given to forming very strong attachments to one person or another.

In most of the 228 subjects, the object of affection is another person; in very few cases is there an expression of affection toward a pet animal, or toward an inanimate object. Without doubt, this is to be explained largely by the fact that, as inmates of an institution, the younger children especially have little opportunity to express affection for anything besides other persons, since they rarely have pets, and most of them have few playthings. Indeed certain observations by the writer lead her to believe that the variety of objects would be greater and the expression of affection more frequent if the children were given an opportunity to show their feeling for other objects of that emotion.

Among the subjects for the experiment on fear, where a tame gray rat was used as a stimulus (see chap. 7), there is a group of 25 who were attracted to the rat; 21 of these expressed real delight by patting, holding, and exclaiming over the animal, while

4 merely showed a lively interest. Since the I.Q.'s of this group spread equally from 11 to 95, there is apparently no relation between the affection expressed and the degree of intelligence.

The more common types of affectionate behavior for each of the four groups can be summarized from the scales for the three aspects of affection and from the distribution of the constituent and total scores within these groups (see scales A, B, C for affection; tables 11, 12).

Affectionate behavior has been observed in less than half of the idiot group, and in those cases where it does appear, it usually occurs at intervals of several months, although there are a few cases where it is noted several times each day. Expressions of affection in this group are usually indiscriminate responses to direct attention, such as patting or kind words; nothing more than a smile, a nod, or an extended arm—reactions that last from a few seconds to a minute. In very few instances is affection shown spontaneously, and attachments between persons are rare and are never more than weak, transient attractions.

Some evidence of affection has been observed in most of the imbeciles, but the type of the behavior varies greatly, just as was found with respect to anger (see page 108). The frequency of the expressions in individual cases varies from once in several months to several times a day. The affectionate behavior itself varies from specific reactions of a few seconds' duration to attachments between persons that last from several days to two or three weeks. In some instances the expression is merely a weak response to some direct attention, such as was found in the idiot group, while in other instances affection for relatives and associates is clearly shown by a desire to be with the attractive person, to caress him and to wait upon him. Attachments between persons are relatively weak and transient; never passionate nor of long duration.

Affectionate behavior has been observed in all the morons, and its occurrence in the individual cases is usually quite frequent—from once a week to several times a day. The specific reactions are not merely momentary responses to some stimulating atten-

tion, but they seem to be expressions of considerable feeling, which last from a few minutes to several hours. Attachments between individuals are common, some of which are weak and short-lived, while others have much strength, and promise to be enduring. On the whole, affection is here a pretty strong emotion, which is shown by associating with the attractive person and by caressing him; by waiting upon him and by presenting him with gifts.

Although the usual expression of affection in the borderline group cannot be clearly distinguished from that in the moron group, there are in the former group more instances of high frequency, of long duration, and of great intensity. In other words, both passionate attachments of relatively short duration, and affection that seems to be genuine and enduring are more common in the borderline group.

Since sex emotion has entered into the foregoing treatment of affection only in so far as the behavior consisted of definite expression of tender feeling, it seems advisable to summarize here the general observations that have been made relative to this matter. The behavior of the individual in the institution only has been considered; no thorough investigation of his conduct previous to commitment was made.

There have appeared two different types of behavior that have their roots in the sex instinct: one, perverted sex practices of various kinds; and the other, definite, and at times uncontrolled, attractions toward the opposite sex. Masturbation of the purely habitual type, practiced openly and apparently without any realization of its significance, does not appear above I.Q. 30. Such behavior has been observed in 17 individuals (8 male and 9 female) or 21 per cent of those below I.Q. 30. Masturbation and other perversions, practiced secretly by individuals who, it seems, must realize to some extent the wrongness of their acts, even though they do not control their impulses, have been reported in 30 individuals (13 male and 17 female) or 13 per cent of the entire group. Their I.Q.'s scatter from 33 to 94.

Strong attraction toward members of the opposite sex has been observed in 39 cases (2 male and 37 female) or 16 per cent of the entire group, whose I.Q.'s are all above 40. Since it is known that such attachments are apt to lead to sex delinquency, an effort is made on the part of the authorities to prevent their development and to put an end to them as soon as they are noted. For this reason, rarely does sex emotion assume an uncontrolled form, although there are several instances of it among the higher grade individuals of this group.

It is probable that these several types of behavior are more common than appears from these observations, and that the proportion of males to females found here is purely a matter of chance, since intensive study was not made of sex emotion. It would seem, however, that sex emotion is manifested in some way almost to the lowest degree of intelligence, but that its more normal expression appears only above the middle imbecile grade.

VII. FEAR

Although the same method has been employed as in studying anger and affection, and under the same conditions, evidence of fear has been found in 50 only, or 22 per cent, of the 228 cases—29 male and 21 female—who range in I.Q. from 5 to 94, in mental age from 7 to 180 months, and in actual age from 5 to 51 years. These data show no relation between the frequency of fear and either intelligence or actual age; and we can draw no conclusions regarding the duration and intensity of fear because the evidence is too scant, and often is not verified.

This infrequent expression of fear is, no doubt, partly to be explained by the highly protective environment in which these people live; an environment which offers many anger and affection stimuli, but few fear stimuli. It is possible, too, that the emotion of fear is not so readily manifested as the emotions of anger and affection, and so may be present, even though it cannot be observed. The results of the experiment to be described

later in this chapter would lead us to believe that the capacity for experiencing fear is more common than the foregoing observations have indicated.

The several causes of fear are listed below, together with the number of persons manifesting fear, and the range in I.Q.

Causes—	No.	I.Q.
1. Persons who have mistreated them	14	20-94
2. Punishment, as whipping	10	12-79
3. Animals, as dog, cat, cow	6	5-63
4. Dark	6	51-76
5. Medical examination, operation, etc.	5	11-71
6. Dreams	2	19-70
7. Persons in authority	4	61-92
8. Wind and fire	2	61
9. Crossing street in San Francisco	1	81
10. Wall thermometer	1	19
11. Large ball	1	6
12. Descending stairs	1	10
13. Water in bath	1	10

Fears of the dark, of persons in authority, of wind and fire, and of crossing a wide street are here restricted to the higher grades of intelligence. Fear of persons who have mistreated them, of punishment and of animals, fears connected with medical attention, and fear caused by dreams seem to be common to no particular degree of intelligence.

The manifestations of fear in the last four instances are most exaggerated, and show a failure to grasp the significance of the object or of the situation. These are cases of low intelligence (I.Q. 6 to 19) where the amount of fear seems disproportionate to the cause. In other cases, usually above the idiot grade, there seems to be an extraordinary lack of fear, due probably to a failure to foresee the possible consequences of their acts. Many will attempt to escape from the Home, even though they have seen that such attempts usually result in apprehension and punishment. The moron boy who tried to drive a stolen car, and crashed it into a tree, failed to see that his escapade might end in dire disaster.

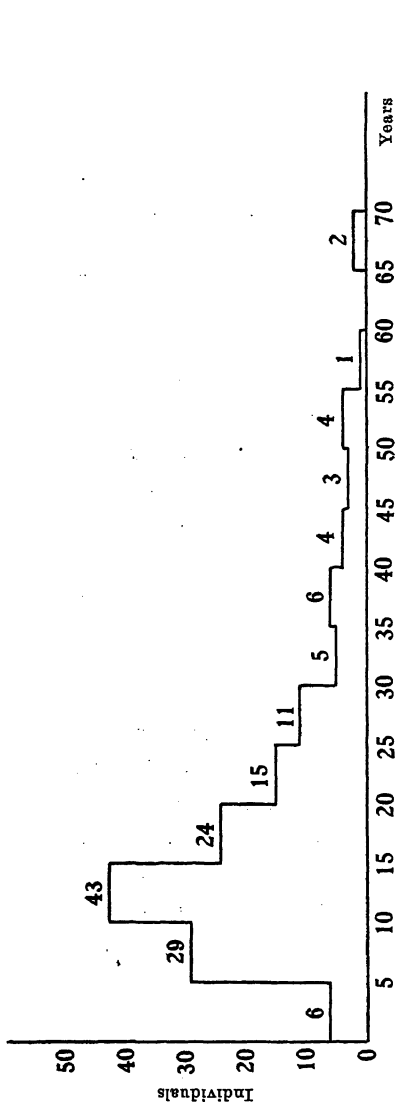
With the hope of throwing more light upon the matter of fear in persons of defective intelligence, an experiment was carried out, in which a tame gray rat was used as a stimulus. The rat was chosen because it is an animal that usually excites fear and one that is not often kept as a pet.

The 153 subjects represent a selected group only in so far as they were chosen from the particular cottages and dormitories where the greater number of the persons under regular observation lived. Of these, 78 are male and 75 female; and 110 are also subjects for the main part of this study, while 43 are new cases.

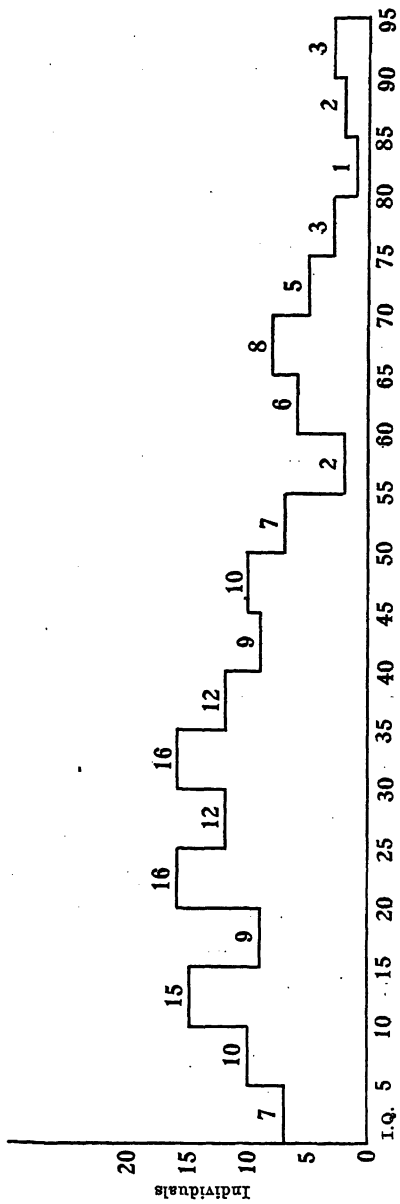
The distribution of the actual ages of these subjects at the time of the experiment, May, 1920, is shown in graph 7. Most of the cases fall between 5 and 30 years of age, as was found in the main group of 228. The greater number of cases have relatively low intelligence as is shown by the distributions of I.Q.'s and of mental ages (see graphs 8 and 9). The mental ages have been corrected to the date given above, upon the assumption that the I.Q.'s are constant.

A brief account will make clear the conditions of the experiment. The experimenter was in a room of medium size and held the rat in her hands. Each person was brought in by an attendant who stayed throughout the experiment. The subject was first permitted to watch the rat; and later, if he made no move to pat it or to take it into his arms, an attempt was made to place it on him. No direct suggestions were made to the subject, although some remarks were passed at times. All reactions were recorded at the time. After the experiment was concluded, the subject was not allowed to join his fellows who were still to be experimented upon. When the experiment was begun upon any one group, it was completed without intermission.

There are certain defects in the data from this experiment which, however, do not detract greatly from its value: first, the reactions were sometimes recorded in too brief form; second, the form of recording sometimes tends to become so stereotyped that



Graph 7. Distribution of the Actual Ages of the Subjects in the Experiment on Fear ($n=153$).



Graph 8. Distribution of I.Q.'s of the Subjects in the Experiment on Fear ($n=152$).

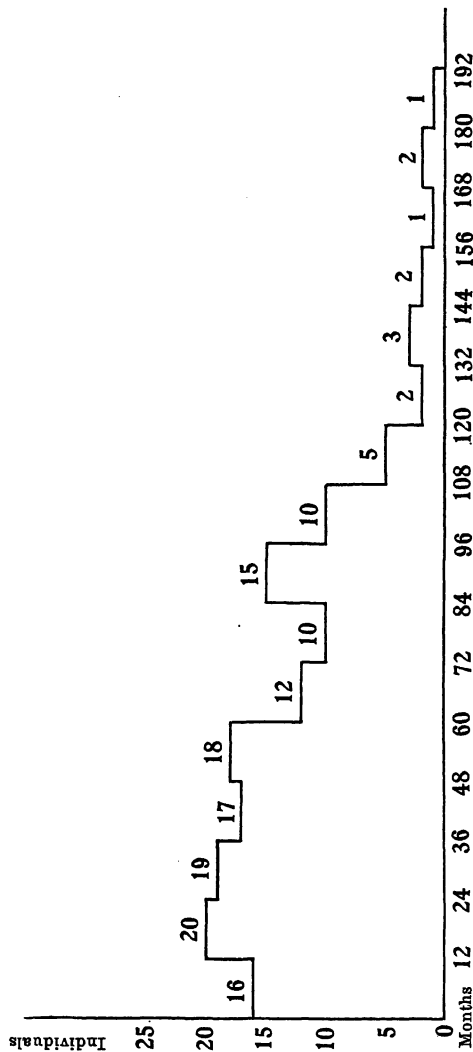
it may cover up small differences; and third, any after-effects that there might have been, were not noted, for the subjects were not observed long enough.

An effort to score the reactions so that the data could be treated statistically met with some difficulty in those reactions which fall between the extremes. Hence, it was decided to submit a part of the reactions to a group of judges, which consisted of 3 members of the faculty and 9 graduate students in psychology, including the writer. Twenty typical reactions² were selected by the writer and submitted to each judge separately. No information was given regarding the character, the age, or the intelligence of the subjects.

Each judge was instructed to rank the reactions from the least to the greatest amount of fear shown, upon the basis of the outward expressions only. It was suggested that the reactions be separated first into several small groups which would represent rather rough distinctions, and then, that each of these groups be studied to discover finer distinctions. If a judge found it impossible to distinguish between any two reactions, he was permitted to give them the same rank. This was done, however, in only four instances.

These ranks are found to be very reliable. There is relatively little disagreement among the judges. This is shown, first, by the low standard deviations of the several series of ranks (see table 16, column 3), and second, by the extremely high correlation between the means of the random halves of the ranks, which is .99 (P.E., .003). This close correspondence of the means of the random halves is readily seen (see table 16, fourth and fifth columns). We may say that the relative positions of the reactions have been determined pretty definitely. The writer was interested in finding that the correlation of her own independent rankings with the means of the half in which hers were not included is .91 (P.E., .027).

² These typical reactions and the ranks given them by the 12 judges are recorded in Appendix II to the original manuscript which is deposited in the library of the University of California.



Graph 9. Distribution of Mental Ages in Months, of the Subjects in the Experiment on Fear ($n=153$).

TABLE 16

MEANS OF THE 12 RANKS GIVEN BY 12 JUDGES FOR EACH TYPICAL REACTION,
WITH STANDARD DEVIATIONS; MEANS OF THE RANDOM HALVES,
AND THE RANKS GIVEN BY B.M.M.

No. of the reaction	Means of the 12 ranks	S.D. from mean	Means of 1st half	Means of 2d half	Ranks given by B.M.M.
1	2.62	1.82	2.92	2.33	3
2	20.00	0.00	20.00	20.00	20
3	4.45	1.67	3.75	5.17	5
4	6.75	1.42	7.00	6.50	6
5	15.41	1.51	15.83	15.00	12
6	2.54	1.51	2.83	2.25	1
7	16.33	1.61	16.33	16.42	17
8	7.41	1.53	7.33	7.60	7
9	13.66	1.70	13.17	14.17	16
10	10.00	1.47	10.17	9.83	13
11	15.66	2.33	15.83	15.50	11
12	5.41	1.70	5.00	5.83	8
13	11.50	1.25	11.17	11.85	10
14	12.00	1.77	12.83	11.17	9
15	11.83	2.17	11.33	12.33	14
16	10.90	1.61	10.33	11.50	15
17	2.79	1.43	3.17	2.42	2
18	17.54	1.25	17.50	17.58	18
19	4.33	1.38	4.50	4.17	4
20	18.75	0.59	19.00	18.50	19

After a careful consideration of the means of the 12 ranks, and of the character of each reaction, the 20 typical reactions have been combined into 6 groups, which have been assigned numerical values from 1 to 6 according to the amount of fear shown. In the case of only one individual did the writer not abide by the decision of the judges. She has reversed the positions of reactions 4 and 12, because she felt that reaction number 4 had not been made sufficiently clear to the judges. Since she knows this individual very well, the writer believes that no fear was felt, but merely contempt at the whole performance.

The 133 reactions remaining from the total of 153 were classified by comparing them to the typical reactions. Table 17 shows how the typical reactions have been combined, and the number of reactions that have been classified under each. In a few instances these so-called typical reactions may be criticized as not being really typical; but they are different reactions whose positions, with respect to the amount of fear shown, had to be determined.

No fear at all is shown by the first group of reactions, for they vary from inattention and indifference to an attraction toward the rat, either kindly or with an intent to injure it. The next group shows some timidity at first, either by watching the animal closely without making any move toward it or by touching it in a hesitant manner; but later, the subject usually pats it or takes it into his hands. Score 3 is given to those reactions that are characterized by slight changes of facial expression, such as flushing and twitching, and by small movements, as trembling, shaking of the hands, and clenching of the fists. In the fourth group the rat is watched very intently from the first, and no movement is made toward it. When an attempt is made to place the rat upon the person of the individual, he either shrinks away or pushes it away. In the fifth group there is a tendency to run away as soon as the rat is seen, or when it is moved toward the subject, and there is usually some crying out. The last is a group of frantic reactions; the subject runs away screaming, and probably crying, as soon as he sees the rat or when it is moved toward him. Looking at these reactions as a whole, we see that the extremes are very far apart, with lack of attention at the one extreme and, at the other, headlong flight.

TABLE 17

FINAL COMBINATIONS OF THE FEAR REACTIONS, WITH THE SCORES
GIVEN TO EACH

Score	No. of the typical reaction	No. of similar reactions	Total
1	1	16	57
	3	11	
	4	1	
	6 and 17	25	
	19	4	
2	12	14	19
	8	5	
3	10	2	9
	13	2	
	15	1	
	16	4	
4	9	4	25
	14	21	
5	5	3	24
	7	2	
	11	14	
	18	5	
6	2	12	19
	20	7	
Total	20	153	153

Under these experimental conditions evidence of fear was brought out in 63 per cent of the subjects, as compared with 22 per cent who gave evidence of fear under the conditions of routine institution life. Of the 110 individuals who were subjects for this experiment and who were under regular observation also, 39 show fear in neither instance, 18 show fear in both, while 5 who had expressed some fear in their routine life expressed none in this experiment; and 48 offer evidence of fear here, in whose behavior none had been observed before.

The correlations of fear with I.Q. and with mental age approach zero, while the correlation with actual age is somewhat higher than was found in the cases of anger and affection (see table 18). The latter correlation may be due to chance or it may indicate a real tendency which further investigation would bring out more clearly.

TABLE 18

CORRELATION OF FEAR WITH I.Q., WITH MENTAL AGE, AND WITH ACTUAL AGE

	I.Q.		M.A.		A.A.	
	<i>r</i>	P.E.	<i>r</i>	P.E.	<i>r</i>	P.E.
Fear	-.018	.055	.016	.055	.115	.054

In each group, except the borderline, all of the 6 scores for fear are found, and the subjects given each score range in intelligence from the idiot to the borderline grade (see table 19).

With respect to the relation of the expression of fear to the degree of intelligence, the results of this experiment agree with the writer's other observations, but she feels that further investigation is necessary before a conclusion can be drawn.

TABLE 19

DISTRIBUTION OF SCORES IN THE EXPERIMENT ON FEAR FOR THE SEVERAL GROUPS, WITH TOTALS

Group	SCORE						Total
	1	2	3	4	5	6	
Idiot	20	2	1	4	5	5	37
Imbecile	25	8	5	18	11	12	79
Moron	7	5	1	1	5	2	21
Borderline	5	4	2	2	3	0	16
Total	57	19	9	25	24	19	153

VIII. GENERAL CONSIDERATIONS, AND SUMMARY OF CONCLUSIONS

In this study it has been assumed that the outward expression of an emotion is a fair index of the character of that emotion as a whole, that an entire emotional state may be judged by one set of its constituent elements. This method was probably more satisfactory in studying emotions in persons of defective intelligence than it would be with persons of normal intelligence, because of the control of the expression of feeling that is usually found with normal intelligence and a stable temperament. For this reason, if for no other, it is doubtful whether the correlations here found between general intelligence and the *expression* of the major emotions would be true for the grades of intelligence above I.Q. 100.

Throughout this study the coefficients of correlation of two of the emotions with I. Q. and with mental age have been found to be nearly the same. In the case of anger they are respectively .67 and .63, and in the case of affection .73 and .69. The similarity in the correlations of these emotions with I.Q. and with mental age is to be explained by the fact that in these data there appears almost no correlation of the emotions with actual age; or it could be safely inferred from the similarity of these two coefficients that there is no significant correlation between these emotions and actual age. In other words, there is not found in this group the high positive correspondence between mental age and actual age that is found in normal persons. There is, however, a slightly higher positive relation between these two factors in those persons 16 years of age or less, than there is for the whole group, since the correlations of the emotions with actual age are a little higher in the former case (see tables 7, 9, 12, and 14). Since no significant correlation of these emotions with actual age has been found in these data, the coefficient of correlation of an emotion either with I.Q. or with mental age may be taken to indicate the general relation between the degree of intelligence and the expression of that emotion.

Merely because the correlations of anger and affection with intelligence are as high respectively as .65 and .70, it is not justifiable to infer that it is really intelligence itself that has been appraised or that the expression of these emotions is a good test of intelligence in individual cases. These coefficients indicate a general tendency only, for there are many wide individual discrepancies between the degree of intelligence and the emotion score. The fact that the correlation is not unity is due not only to many small variations, but also to a considerable number of very great variations, as was pointed out in the chapters on anger and affection. For example, a person with the intelligence of an idiot or imbecile is never socially fit, but persons of such low intelligence are frequently found who are very emotional.

Since little conclusive evidence was obtained with respect to fear, it was possible to compute only one intercorrelation of the emotions, namely, that of anger with affection, which, computed on the basis of the total scores, is .62. On the basis of this coefficient and those of the correlations of anger and affection with I.Q. and with mental age, it was possible to compute certain partial correlations. These coefficients are recorded in table 20, together with the corresponding original correlations.

In every case the partial is much lower than the original correlations, which indicates that there is a complexity of elements entering into the relationships here found—elements that probably have their sources both in the actual nature of the case and in the scoring of the emotions. Affection apparently was a greater factor in the original correlation of anger with intelligence, than was anger in the original correlation of affection with intelligence. Intelligence has proved to be a large factor in the correlation of anger with affection. It would seem that anger and affection spring from a common source of emotionality, and that this emotionality is highly correlated with intelligence. The evidence gathered so far would indicate that fear is not directly connected either with intelligence or with anger and affection.

TABLE 20
PARTIAL CORRELATIONS* OF THE SEVERAL ELEMENTS

					Partial r	r
Anger	×	affection	—	I.Q.	.26	.62
Anger	×	affection	—	M.A.	.33	.62
Anger	×	I.Q.	—	affection	.38	.67
Anger	×	M.A.	—	affection	.34	.63
Affection	×	I.Q.	—	anger	.50	.73
Affection	×	M.A.	—	anger	.45	.69

× Signifies correlation between two elements.

— Indicates the element rendered constant.

It may be well to summarize what evidence there is in these data regarding the form of emotion that develops earliest, that is, at the lowest level of intelligence. Anger is first noted at I.Q. 1; the same is true for fear under experimental conditions (the same individual in both instances), but under routine conditions fear does not appear until I.Q. 5. Affection first occurs at I.Q. 4. In the second occurrence of these emotions the sequence is clear, for anger appears at I.Q. 4, affection at I.Q. 5, and fear at I.Q. 6 under both sets of conditions. Of the 52 cases in the idiot group which were studied under routine conditions, 36 show anger, a smaller number, 29, show affection, while even less, 11, show fear. Under experimental conditions only 17 out of the 37 in the idiot group show fear. These facts indicate that anger may develop at a lower level of intelligence than either affection or fear, while the relative points of development of the latter two is uncertain, although the evidence is slightly greater that affection may appear earlier than fear.

* Formula used for computing partial correlations:

$$r_{12.3} = \frac{r_{12} - r_{13}r_{23}}{\sqrt{1-r_{13}^2}\sqrt{1-r_{23}^2}}$$

The numbers 1, 2, and 3 indicate the elements, of which number 3 is the element rendered constant.

At this point a consideration of the cases where expression of these emotions are absent is suggestive. First, there are more individuals who do not express affection than who do not express anger; and second, the 19 cases where anger is absent spread from I.Q. 1 to 29, while the 29 cases where affection is absent scatter from I.Q. 1 to 37, 8 points higher in the distribution of I.Q.'s. Absence of fear is very common (78 per cent under routine conditions, and 37 per cent under experiment conditions) and is not restricted to any particular levels of intelligence. There may be an indication here that affection develops at a higher level of intelligence than anger, and is more closely connected with intelligence. The evidence would seem to indicate that fear is not directly connected with intelligence, which agrees with the previous observations.

The significant findings of this study may be briefly summarized as follows:

ANGER

1. Expression of anger is very frequent in all grades of mental defect, except in that of the lowest idiots.

2. A high positive correlation of anger with intelligence is found, the coefficient being about .65.

3. The causes of anger have been determined principally by two factors: one, the differing environments in which the people lived; and the other, the degree of intelligence. As intelligence increases, causes which are connected closely with the person's physical being tend to become less frequent, while causes which involve a greater understanding of the situation become more prominent.

4. The usual expression of anger differs in the four groups although there is much overlapping of these groups and much individual variation within each group.

5. The complex emotional states which are akin to anger—jealousy, hatred, and revenge—are observed very infrequently.

AFFECTION

1. Evidence of affection is very common in all grades except the lowest idiots.

2. The coefficient of correlation of affection with intelligence is a little higher than that of anger with intelligence, being about .70.

3. There is a clear change in the character of the expression from the low to the high levels of intelligence.

4. Sex emotion is manifested in some way, almost to the lowest degree of intelligence; but its more normal expression appears only above the middle imbecile grade. It is often perverted and uncontrolled.

FEAR

1. Under the conditions of routine institution life, fear was observed in only 22 per cent of the cases. There is no direct connection apparent between the expression of fear and the degree of intelligence, such as was found in the cases of anger and affection.

2. Under experimental conditions 63 per cent of the subjects showed fear, but the results reveal no significant correlation with intelligence.

GENERAL

1. A positive correlation of .62 is found between anger and affection. However, when the effect of the intelligence factor is rendered constant by partial correlation, this coefficient is reduced to about .30. All the partial correlations point to a considerable interrelation of the three elements—intelligence, anger, and affection. It would seem that anger and affection are complementary emotions that spring from a common source of emotionality which is highly correlated with intelligence.

2. Affection appears to be more closely and directly bound up with intelligence than is either anger or fear; for fear apparently is not directly connected with intelligence, and the original correlation of affection with intelligence is about 5 points higher, and the partial correlation more than 10 points higher than the corresponding correlations with anger. There appears here, also, an interesting disconnection between anger and fear, two emotions that are often thought to be of a similar nature.

3. The positive correlations that have been found between intelligence and the emotions of anger and affection, although they are high, indicate general tendencies only. They do not mean that one can predict, without error, from his degree of intelligence what a person's degree of emotionality is, or from his degree of emotionality what his degree of intelligence is; for these coefficients have been reduced from unity not only by relatively small variations, but also by wide individual discrepancies between the degree of intelligence and the expression of the emotion.

4. In no case was a significant correlation found between an emotion and actual age. There is not in the group here studied a high positive relation between mental age and actual age; hence, if an emotion is highly correlated with mental age, it will not be correlated to any significant degree with actual age.

5. The evidence from these data suggests, but hardly more than suggests, that anger may develop at a lower level of intelligence than either affection or fear, while little indication is offered regarding the relative points of development of the latter two emotions.

REFERENCES

1. BIANCHI, LEONARDO: *A textbook of psychiatry for physicians and students*, 1906. (Tr. by MacDonald.)
2. BINET, ALFRED, AND SIMON, TH.: *The intelligence of the feeble-minded*, 1916. (Tr. by Kite.)
3. CHURCH, ARCHIBALD, AND PETERSON, FREDERICK: *Nervous and mental diseases*, 1911.
4. CLOUSTON, THOMAS SMITH: *Unsoundness of mind*, 1911.
5. COLE, ROBERT HENRY: *Mental diseases*, 1913.
6. DARWIN, CHARLES: *The expression of the emotions in man and animals*, 1910.
7. DEFENDORF, ALLEN ROSS: *Clinical psychiatry*, 1907. (Adapted from Kraepelin, *Lehrbuch der Psychiatrie*, ed. 7.)
8. PÉRÉ, CHARLES SAMSON: *The pathology of the emotions*, 1899. (Tr. by Park.)
9. GODDARD, HENRY HERBERT: *Psychology of the normal and sub-normal*, 1919.
10. GODDARD, HENRY HERBERT: *Human efficiency and levels of intelligence*, 1920.
11. HENDERSON, CHARLES RICHMOND: *Introduction to the study of the dependent, defective, and delinquent class, and of their social treatment*, 1893.
12. HOLLANDER, BERNARD: *Abnormal children*, 1916.
13. HOLLINGWORTH, LETA STETTER: *The psychology of subnormal children*, 1920.
14. IRELAND, WILLIAM WETHERSPOON: *The mental affections of children*, 1900.
15. KELLY, ROBERT LINCOLN: "Psycho-physical tests of normal and abnormal children," *Psychol. Rev.*, Vol. X, No. 4, 1903.
16. KELYNACK, THEOPHILUS NICHOLAS (ed.): *Human derelicts*, 1914.
17. KELYNACK, THEOPHILUS NICHOLAS: *Defective children*, 1915.
18. KUHLMANN, FRED: "Experimental studies in mental deficiency," *Am. Jour. Psychol.*, Vol. XV, 1904.
19. LAPAGE, CHARLES PAGET: *Feeble-mindedness in children of school age*, 1911.
20. MACPHERSON, JOHN: *Mental affections*, 1899.
21. MURPHY, J. PRENTICE: "Illegitimacy and Feeble-mindedness," *Ment. Hygiene*, Vol. I, 1917.

22. NORSWORTHY, NAOMI: *Psychology of mentally deficient children*, 1906.
23. ORDAHL, GEORGE, AND ORDAHL, LOUISE ELLISON: "Qualitative differences between levels of intelligence in feeble-minded children," *Jour. of Psycho-Asthenics*, Monog. Suppl., Vol. I, No. 2, 1915.
24. PETERSON, FREDERICK: "Psychology of the idiot," *Am. Jour. Insan.*, Vol. LIII, 1896.
25. POTTER, H. W.: "Personality in the mental defective," *Ment. Hygiene*, Vol. VI, No. 3, 1922.
26. RIBOT, THEODULÉ ARMAND: *The psychology of the emotions*, 1897.
27. SANTA-MARIA, EMILIA FORMIGGINI: *La psicologia del fanciullo normale ed anormale*, 1910.
28. SEGUIN, EDWARD: *Idiocy, and its treatment by the physiological method*, 1907. (Teach. Coll. Educ. Repr.)
29. SHERLOCK, E. B.: *The feeble-minded*, 1911.
30. SHUTTLEWORTH, G. E., AND POTTS, W. A.: *Mentally deficient children*, 1916.
31. SOLLIER, PAUL: *Psychologie de l'idiot et de l'imbécile*, 1901.
32. TANZI, EUGENIO: *A textbook of mental diseases*, 1909. (Tr. by Robertson and MacKenzie.)
33. TERMAN, LEWIS M.: *The measurement of intelligence*, 1916.
34. TREDGOLD, A. F.: *Mental deficiency*, 1915.
35. VOISIN, JULES: *L'idiotie*, 1893.
36. WATTS, FRANK: *Echo personalities*, 1918.
37. WEBB, EDWARD: "Character and intelligence," *Brit. Jour. Psychol.*, Monog. Suppl., Vol. I, No. 3, 1915.
38. WEIDENSALL, JEAN: *The mentality of the criminal woman*, 1916.
39. WHITE, WILLIAM A.: *Outlines of psychiatry*, 1921.
40. WOODROW, HERBERT: *Brightness and dullness in children*, 1919.
41. WYLIE, A. R. T.: "Instincts and emotions in the feeble-minded," *Jour. of Psycho-Asthenics*, Vol. V, 1901.
42. YOUNG, MEREDITH: *The mentality of the defective child*, 1916.

APPENDIX

Two typical cases are here summarized to illustrate the several sources of the data, and the kinds of data that have been treated. The one case is a high-grade idiot boy who has shown few emotional reactions and so has been given low scores, while the other is a very emotional moron girl whose reactions have been scored high.

Case 47. Aro.T. (male), I.Q. 16, M.A. 22, A.A. 11; anger total score 10 (3, 4, 3), affection total score 3 (1, 1, 1); evidence of fear.

1. GENERAL ACCOUNT OF THE CASE

T. is a very wild looking little Mexican boy. His eyes are very large and bright, and his mouth is usually open, probably because of his defective palate. He seems to understand something of what is said to him, and walks about readily, but cannot dress himself and performs no tasks. When he is disturbed he usually yells loudly, and may throw his arms about, but never attempts to strike.

2. NOTES FROM THE APPLICATION FOR ADMISSION (NOT CONSIDERED TO BE RELIABLE)

Excitable; temper not very evident; fond of playing alone; fond of nurses but pays no attention to other children; is affectionate; not obstinate; slightly obedient when he understands.

3. INFORMATION ABOUT EMOTIONAL REACTIONS OBTAINED BY OBSERVATION AND INQUIRY

a. Anger

I have seen him angry a few times when he was taken to some place to which he did not wish to go, and the attendants report that he sometimes shows anger when he does not get an object that he wants or when something is taken from him. He does little more than cry out and perhaps cover his face with his hands. In about fifteen minutes he is quiet again. However, such reactions are infrequent, not occurring more often than once in two weeks.

b. Affection

There is no evidence that he feels affection for anything; he does not even respond to being petted or held in an attendant's lap.

c. Fear

It is reported that he has shown fear at times, for instance when another child makes a move to slap him, or when he is put in the dentist's chair. He showed extreme fear of the rat.

Case 154. Pre.M. (female), I.Q. 61, M.A. 118, A.A. 20; anger total score 15 (6, 5, 4), affection total score 16 (6, 5, 5); evidence of fear.

1. GENERAL ACCOUNT: APPEARANCE, OCCUPATION

M. is a thin, round-shouldered young woman about 5½ feet in height. She is a medium brunette, not attractive, for her face is drawn and wrinkled, her eyes do not look at one frankly and steadily, and her voice is very harsh and disagreeable. On the whole she has not a pleasing personality.

During the time of this investigation she lived in one of the unlocked cottages, and could be trusted to go to and from her work unaccompanied. She was a chamber-maid at one of the residences, and spent a few hours of each day in school.

2. INFORMATION OBTAINED FROM VARIOUS RECORDS

a. Notes from the Application for Admission (not considered to be reliable)

Excitable; bad temper; very nervous; dull and apathetic; laughs and weeps without apparent cause; fond of children; not fond of animals; not affectionate; profane; obstinate; passionate; stealthy; vulgar; not obedient.

b. Notes from the Industrial Record

Psychological:

Judgment indifferent but inclined to be consistent; attitude considerate, within limits of her I.Q.; sensory motor coordination average; sense of values indifferent; likely to be capable of training.

Social:

Language frequently profane; honest and truthful; "pleasant disposition"; quarrelsome; very noisy; will not accept criticism but will criticize others; shifts responsibility.

c. School Record: One Teacher's Note

In school she is interested and her behavior good.

3. INFORMATION ABOUT EMOTIONAL REACTIONS OBTAINED BY OBSERVATION AND INQUIRY

a. Anger

She is described by the head attendant at her cottage as being very irritable, "spunky," either pouting or lighthearted; resents being disturbed when she is busy, and having her word contradicted; when provoked she swears "like a pirate."

One day upon meeting one of the teachers, she blurted out, "I'm mad. I'm never going to smile again"; and when asked what the trouble was, "Don't like it here. I wanted to go out to work [be paroled]. I'm mad, and I'm going to stay mad." And so she did, for when I met her a couple of hours later she looked very grumpy and scarcely spoke to me.

At another time she pouted for several hours because I failed to greet her as I passed by.

Usually she says very little after the first show of anger, but sulks for hours. Her anger reactions have never been known to be violent, and the best way to deal with her when she is angry is to leave her alone.

b. Affection

The head attendant considers her to be a very likable girl, and thinks that she is more inclined to like people than to dislike them.

I have observed that she has formed attachments to several girls, attendants, and officers, toward whom she was very demonstrative. She stayed with the attractive person as much as possible, caressed her, offered her gifts, and waited upon her.

For several months she was very much attracted to me. Whenever she saw me, she would come running, put her arms about me, and ask if I liked her. She gave me a sample of crochet and a crocheted napkin ring, often put flowers in my room, and once wrote me a letter, and at another time sent me a postal card.

She never seemed to be attracted to the opposite sex, and did not especially enjoy dances and parties where members of both sexes were present.

c. Fear

I have never seen her afraid, but the attendants report that she is terrified by the dark and by strong wind. She says she was afraid of her drunken father.

UNIVERSITY OF CALIFORNIA PUBLICATIONS
IN
PSYCHOLOGY

Vol. 3, No. 4, pp. 147-213

April 3, 1925

FACTORS CONTRIBUTING TO THE
DELINQUENCY OF DEFECTIVE GIRLS

BY
JEAN WALKER

UNIVERSITY OF CALIFORNIA PRESS
BERKELEY, CALIFORNIA

UNIVERSITY OF CALIFORNIA PUBLICATIONS

Note.—The University of California Publications are offered in exchange for the publications of learned societies and institutions, universities and libraries. Complete lists of all the publications of the University will be sent upon request. For sample copies, list of publications or other information address the **MANAGER OF THE UNIVERSITY PRESS, BERKELEY, CALIFORNIA, U. S. A.** All matter sent in exchange should be addressed to **EXCHANGE DEPARTMENT, UNIVERSITY OF CALIFORNIA LIBRARY, BERKELEY, CALIFORNIA, U. S. A.**

Publications of the University of California Press may also be obtained from **THE CAMBRIDGE UNIVERSITY PRESS, FETTER LANE, LONDON, E. C. 4, ENGLAND**, to which orders originating in Great Britain and Ireland should be sent.

PSYCHOLOGY.—George M. Stratton, Warner Brown, and Edward C. Tolman, Editors.

Price per volume, \$3.50. Cited as Univ. Calif. Publ. Psychol.

Vol. 1.	1. The Judgment of Difference, with Special Reference to the Doctrine of the Threshold, in the Case of Lifted Weights, by Warner Brown. Pp. 1-71, 4 text figures. September, 1910	\$0.50
	2. The Process of Abstraction, an Experimental Study, by Thomas Verner Moore. Pp. 73-197, 6 text figures. November, 1910	1.00
	3. The Judgment of Very Weak Sensory Stimuli, with Special Reference to the Absolute Threshold of Sensation for Common Salt, by Warner Brown. Pp. 199-268, plates 1-4. February, 1914 .....	.60
	4. Habit Interference in Sorting Cards, by Warner Brown. Pp. 269-321. April, 1914 .....	.50
	5. Diurnal Variations in Memory and Association, by Arthur I. Gates. Pp. 323-344. March, 1916 .....	.20
	6. Correlations and Sex Differences in Memory and Substitution, by Arthur I. Gates. Pp. 345-350. May, 1916 .....	.05
Vol. 2.	1. Variations in Efficiency during the Day, together with Practice Effects, Sex Differences, and Correlations, by Arthur I. Gates. Pp. 1-156. March, 1916	1.50
	2. Experiments on Attention and Memory, with Special Reference to the Psychology of Advertising, by J. M. Levy. Pp. 157-197. March, 1916 .....	.40
	3. The Psychology and Physiology of Mirror-Writing, by Justin K. Fuller. Pp. 199-265. May, 1916 .....	.70
	4. Memory and Association in the Case of Street-Car Advertising Cards, by Walter S. Heller and Warner Brown. Pp. 267-276. May, 1916 .....	.10
	5. A Comparison of the Japanese Folk-Song and the Occidental: A Study in the Psychology of Form, by Sangoro Ito. Pp. 277-290. May, 1916 .....	.15
	6. Individual and Sex Differences in Suggestibility, by Warner Brown. Pp. 291-430. July, 1916	1.50
Vol. 3.	1. An Experimental Study of Abnormal Children, with Special Reference to the Problems of Dependency and Delinquency, by Olga Bridgman. Pp. 1-59. March, 1918 .....	.65
	2. Analysis of Package Labels, by Walter S. Heller. Pp. 61-72, plates 1-3. January, 1919 .....	.15
	3. A Study of the Major Emotions in Persons of Defective Intelligence, by Beulah May Morrison. Pp. 73-145. December, 1924 .....	.90
	4. Factors Contributing to the Delinquency of Defective Girls, by Jean Walker. Pp. 147-213. April, 1925 .....	.85

PHILOSOPHY.—George P. Adams, J. Loewenberg, and S. C. Pepper, Editors.

Cited as Univ. Calif. Publ. Philos.

The first volume of the University of California Publications in Philosophy appeared in November, 1904, and was prepared in commemoration of the seventieth birthday of Professor George Holmes Howison, under the direction of a committee of his pupils composed of Evander Bradley McGilvary, Charles Henry Eieher, Harry Allen Overstreet and Charles Montague Bakewell. The price of the volume is \$2. It may be had bound, or the papers may be obtained separately. Its contents are:

Vol. 1.	1. The Summum Bonum, by Evander Bradley McGilvary. Pp. 1-27 .....	.25
	2. The Essentials of Human Faculty, by Sidney Edward Mezes. Pp. 28-55 .....	.25
	3. Some Scientific Apologies for Evil, by George Malcolm Stratton. Pp. 56-71 .....	.15
	4. Pragmatism and the <i>a priori</i> , by Charles Henry Eieher. Pp. 72-91 .....	.20
	5. Latter-day Flowing-Philosophy, by Charles Montague Bakewell. Pp. 92-114 .....	.20

UNIVERSITY OF CALIFORNIA PUBLICATIONS
IN
PSYCHOLOGY

Vol. 3, No. 4, pp. 147-213

April 3, 1925

FACTORS CONTRIBUTING TO THE
DELINQUENCY OF DEFECTIVE
GIRLS

CONTENTS

	PAGE
Preface.....	148
I. The defective delinquent; a summary of the literature.....	149
II. Data on the antecedent conditions in the lives of the group studied....	158
1. Types of offense	158
2. Mental status of the group.....	160
(a) Age and mental age.....	161
(b) Results of reexamination.....	162
(c) Individual tests.....	164
(d) Range and scattering of tests.....	168
(e) Interests	169
(1) Vocational	170
(2) Recreational	172
(f) Emotional characteristics.....	173
3. Physical status	174
4. School records	177
5. Occupational records.....	178
6. National groups	182
7. Home conditions.....	186
(a) Occupation of parents.....	186
(b) Social conditions and standards.....	189
III. Disposition and subsequent history.....	192
1. General statement	192
2. First court order, and probation records	195
3. Subsequent court orders.....	196
4. Summary of the last follow-up findings.....	199
IV. Conclusions.....	202
Appendix. Case histories	208

PREFACE

Although recent research has shown definitely that the amount of mental deficiency among juvenile delinquents does not approximate the high figure which early investigators put forward, yet feeble-mindedness stands forth as a sufficiently constant factor in all investigations of delinquency to merit definite and critical attention. Particularly in the studies of women and girl offenders does the correlation between tested deficiency and legally recognized delinquency remain significant.

This paper concludes an investigation of the defective delinquent girl, which was begun with a twofold practical aim: first, to ascertain in the lives of defective delinquent girls the antecedent conditions which have contributed to their appearance before a court, with the hope that some light might be thrown upon means of preventing delinquency; second, to determine, if possible, the treatment most effective for the girl who has already become delinquent, by studying the subsequent history of recurring cases. It was hoped, by following the behavior of girls of high and low intelligence coming from various types of environment and having different types of delinquency records, that a definite standard for constructive action might be worked out on a basis of successful conduct or failure under different programs of care, and that the possibilities and limitations of prognosis in specific cases might thus be determined.

The investigation has included both a clinical study of a group of delinquent girls referred by the San Francisco Juvenile Court to the psychological clinic of the University of California Medical School for examination, and a follow-up study of these same girls. The group includes two hundred forty-six girls, first examined during the years 1914 to 1918 inclusive, whose subsequent careers were followed until December, 1921. In forty-three of these cases, there was a dependency record previous to that of delinquency, which made it possible to follow the histories for as long a period as twelve or fourteen years. The group was arbitrarily

limited to those who, at the time of the first examination, had a mental age of XI years or less (Goddard's 1911 Revision). Since the California Juvenile Court Law does not distinguish between dependents and delinquents, calling them all wards of the court, we have accepted the classification made by the officers of the court and the probation force. The Girl Department handles girls who are delinquent or inclined toward delinquency as opposed to those cases in which there is dependency with perhaps slight misconduct. All cases here reported were being handled by the Girl Department at the time of the examination, although previously many had been handled by the Family Relations Department.

I. THE DEFECTIVE DELINQUENT; A SUMMARY OF THE LITERATURE

Definitions. The term *delinquency*, as accepted by most investigators, is restricted to that degree of social non-conformity which involves legal recognition. The legal definition of delinquency varies considerably in different localities. In California, as in many other states, delinquency and dependency are not legally differentiated. Any person under the age of 21 who not only has committed some specific infraction of the law but who is "in danger of leading an idle, dissolute, lewd or immoral life" may be made a ward of the California Juvenile Court.¹ In many states the legal definition of juvenile delinquency is not so inclusive, while in others, children of 16 years are no longer regarded as juveniles. But by investigators the term is most commonly limited to recidivists and to first offenders who have shown serious non-conformity.

Delinquency, then, is a relative term. It is a deviation from the social and legal standard which the community accepts. Delinquency among girls is very largely a matter of sexual non-conformity. Holsopple² makes the pertinent statement that

¹ *California Statutes* (1915; amended, 1917), pp. 1002-1022.

² Holsopple, Frances Quinter, *Social Non-conformity: an Analysis of 430 Delinquent Girls and Women* (1919), p. 5.

"perhaps there is no field in which the standards of behavior vary so widely in relation to race, time, and place as the standards which govern sexual relationships." In a city like San Francisco, whose population includes so many national, social, and economic groups, the attempt to make widely divergent sex standards conform to those socially acceptable often results in the stigmatization, as immoral or delinquent, of individuals whose standards are not at variance with those of their social and racial group.

The term *mental deficiency* offers considerable variability. We find definitions in terms of clinical types, as cretins, mongols, epileptics, etc. This kind of definition has its advantages but covers only a small part of those who may be recognized even by the lay person as defective. Lapage³ found only 9 per cent of 784 school children, in special groups, who could be so classified.

A social criterion has found practically universal acceptance. Unquestionably, the most widely accepted definition is that framed by the British Royal Commission and is found in the British Mental Deficiency Act of 1913. According to this act, mental defectives are:

Persons in whose case there exists from birth or from an early age mental defectiveness not amounting to imbecility, yet so pronounced that they require care, supervision, and control for their own protection or for the protection of others, or, in the case of children, that they, by reason of such defectiveness, appear to be permanently incapable of receiving proper benefit from the instruction in ordinary schools.

In substance this definition has been accepted absolutely or with slight modification by Tredgold,⁴ Goddard,⁵ Karl Pearson,⁶ and a host of other investigators. But, as Kuhlmann⁷ and countless others have pointed out, it is too indefinite to be a satisfactory working criterion.

The past twenty years have seen attempts to restate this social conception of mental deficiency in definite, quantitative

³ Lapage, C. P., *Feeble-mindedness in Children of School Age* (1911), pp. 47, 48.

⁴ Tredgold, A. F., *Mental Deficiency* (1915), p. 8.

⁵ Goddard, H. H., *Feeble-mindedness; Its Causes and Consequences* (1914), pp. 1-6.

⁶ Pearson, Karl, *Mendelism and the Problem of Mental Defect* (1914), p. 9.

⁷ Kuhlmann, F., "What Constitutes Feeble-mindedness," *Journal of Psycho-Asthenics*, vol. 19 (1915), pp. 216-236.

terms through correlation of social failure with objective measurements. Individual tests with supposed diagnostic value, groups of tests and test scales for determining mental age levels have come into being and have been highly standardized with the purpose of developing a quantitative definition of deficiency. Probably the fullest compilation of the many tests, scales, and test methods has been made by Stern and Wiegmann.⁸ Mitchel and Ruger⁹ have published a bibliography of fourteen hundred and twenty-eight references. These show how intensive and how extensive have been the efforts to study intelligence.

But where on the quantitative scale is mental deficiency to be located? Binet,¹⁰ Goddard,¹¹ and countless others have described mental deficiency in terms of retardation and mental age. Kuhlmann,¹² Stern,¹³ Terman,¹⁴ and others express it in terms of intelligence quotient, since a year's retardation at different ages has a different significance. There has been, however, considerable disagreement as to the amount of retardation and as to the size of the intelligence quotient which shall be diagnostic of mental deficiency. Yerkes¹⁵ has advocated an intelligence coefficient. Norsworthy¹⁶ and Pearson¹⁷ have defined differences of intelligence in terms of deviation from the average. Miner,¹⁸

⁸ Stern, William, and Wiegmann, Otto, "Methodensammlung zur Intelligenzprüfung von Kindern und Jugendlichen," *Zeitschrift für Angewandte Psychologie*, 1921.

⁹ Mitchel, David, and Ruger, Georgie J., *Psychological Tests, revised and classified*, 1918.

¹⁰ Binet, Alfred, translated by Kite, Eliz. S., "The Development of Intelligence in Children," *L'Année Psych.* (1916).

¹¹ Goddard, H. H., *Training School Bulletin*, 1911, 1912.

¹² Kuhlmann, F., "Degree of mental deficiency in children as expressed by the relation of age to mental age," *Journal of Psycho-asthenics* (1913), vol. 17, pp. 132-143.

¹³ Stern, William, translated by Whipple, G. M., *The Psychological Methods of Testing Intelligence* (1914), pp. 77ff.

¹⁴ Terman, Lewis H., *The Measurement of Intelligence* (1916), p. 79.

¹⁵ Yerkes, Robert M., and Wood, Louise, "Methods of Expressing Results of Measurements of Intelligence," *Journal of Educational Psych.* (1916), vol. 7, pp. 593-606.

¹⁶ Norsworthy, Naomi, "Psychology of Mentally Defective Children," *Archives of Psych.* (1906).

¹⁷ *Mendelism*, pp. 35ff.

¹⁸ Miner, J. B., *Deficiency and Delinquency* (1918), pp. 13ff.

seeking a method by which various investigations could be compared, stresses what he calls a percentage definition. He holds that if investigators could arbitrarily settle upon a percentage which would define the number of intellectually weak which society is at present justified in isolating, that percentage would determine where on the scales of intellectual ability, as determined by objective tests, the upper limit of feeble-mindedness should be located. In his method, as in all other methods, a point or a span is arbitrarily chosen as a differential for defective and non-defective intelligence. It has the advantage, if accepted, of making all scales comparable.

This struggle toward an accurate quantitative definition of mental deficiency has resulted in an avalanche of diverse opinions which in turn have led to more refined, more controlled, and more extensive investigations. The trend of these studies has been toward a lowering of norms. Early research with highly selected groups placed the upper limits of intellectual deficiency too high. Subsequent investigations, particularly those of the army, show that not only must the norms for deficiency be lowered, but likewise the norms for average intelligence. The average mental age of ninety-three thousand, nine hundred and sixty-five drafted army men was found to be 13.08.¹⁹ Of the group, 13.6 per cent had a mental age of less than X years. The results of all this work have thrown even more doubt on the accuracy of differentiation. There seems to be considerable agreement, however, among investigators in accepting the IX-year level as indicative of definite feeble-mindedness, the X-year as probable, and the XI-year as doubtful feeble-mindedness, where there are no psychotic complications (Miner,¹⁸ Terman,²⁰ Goddard²¹).

Before leaving this subject of differentiating norms, a word should be said of the clinician's attitude toward them. When considering results in the mass, he accepts these criteria as accurate within limits and recognizes that they give a perspective. But

¹⁹ National Academy of Sciences, *Memoirs*, vol. 15 (1921).

²⁰ Terman, Lewis M., quoted in Fernald, Hayes and Dawley, *A Study of Women Delinquents in New York State* (1920), p. 418.

²¹ Goddard, H. H., *Human Efficiency and Levels of Intelligence*, 1920.

no clinical psychologist can accept any inflexible criterion. To quote an expression of the common attitude, Kohs²² says that the acceptance of a single differentiating intelligence quotient is too artificial a process to "jibe with actual clinical findings."

Incidence of deficiency among delinquents.—The percentages of mental defectives reported among delinquents have varied widely. These figures, from which many premature generalizations have been made, range from less than 10 per cent to more than 90 per cent. This is due in the main to two factors. In the first place, the number of those ranking as deficient will depend upon the scale used and particularly upon the point chosen as the upper limit of deficiency. A second factor, which must be properly weighed before any accurate generalizations can be made as to the incidence of mental defect in general among delinquents, results from any condition making for specialized selection in the groups.

The first factor has been considered very comprehensively and enlighteningly by Miner.²³ He has covered the literature of tested delinquents through the year 1917, and has compiled results on a comparable basis. Calling those "presumably deficient" who correspond to the lowest 0.5 per cent of the general population as ascertained by the objective results from random groups, and calling those "doubtful" who correspond to the next 1.0 per cent, he tabulates the re-interpreted results of nineteen investigators of delinquent girls and women (3,384 cases). In this number are included penitentiary, reformatory and training-school cases, special groups of sex offenders, and one group from a juvenile detention home. The presumably deficient ranged from 9 per cent to 48 per cent, with a median for the different investigators of 25 per cent. The presumably deficient plus the doubtful cases (1.5 per cent of general population, mental ages of IX and X, on the Goddard scale) ranged from 19 per cent to 75 per cent, with a median of 48 per cent. Fernald²⁴ in a recent report of 447 delinquent females aged about 15 years, finds 22.1 per cent of the

²² Kohs, Samuel C., *Journal of Delinquency*, vol. 2 (1917), p. 20.

²³ *Op. cit.* (ref. 18), chap. 6.

²⁴ Fernald, Mabel R., Hayes, M. H. S., and Dawley, Almena, *A Study of Women Delinquents in New York State* (1920), p. 420.

group below X years (Stanford scale) as opposed to 13.6 per cent in the army figures, and 3.8 per cent above XV years as opposed to 21.5 per cent in the army group. These figures are sufficiently conservative to be accepted for women and girl offenders who have come in contact with the law. Miner's data show that mental deficiency is distinctly more frequent among women and girls than among men and boys in institutions for delinquency and crime. Again, it is more frequent among girls and women held for sex offenses than among those held for other offenses. Fernald's results agree with this conclusion.

This brings us to the other factors which tend to produce differences in the percentages of deficiency found by investigators, namely, the various selective influences in different groups. These selective factors, which mitigate against accuracy in determining the real percentage of deficiency among delinquents in general, have been discussed by Crafts and Doll.²⁵

The more intelligent delinquent is less liable to be apprehended than is the defective. With regard to the statement above, that deficiency occurs oftener in female delinquents, Doll points out that inclination of the sexes to different types of delinquency, together with the differences in treatment accorded for the same delinquency, is responsible for the different proportions found.

The significance of delinquency among girls. Since delinquency among girls is largely a matter of sexual non-conformity it assumes a threefold significance: medical, biological, and social or moral.

From the point of view of public health the sexual delinquent, if promiscuous, must always be considered as a potential spreader of venereal disease. Investigations indicate that defectives show a higher percentage of venereal infection than do those of better intelligence.²⁶ The venereal groups in the army²⁷ are characterized by mental inferiority, from which it is inferred that "men of inferior intelligence are more likely to expose themselves to venereal infection or are less likely to employ suitable prophylactic measures."

²⁵ Crafts, L. W., and Doll, A. E., "The Proportion of Mental Defectives," *Journal of Delinquency*, vol. 2 (1917), pp. 119-143, 191-208.

²⁶ Fernald, *op. cit.* (ref. 24), pp. 516-519.

²⁷ National Academy of Sciences, *Memoirs*, vol. 15 (1921), p. 811.

Biologically considered, the defective delinquent girl presents the problem (as do non-delinquent defectives) of the propagation of mentally inferior children whether legitimate or otherwise. The abundant literature on the subject of feeble-mindedness and inheritance has been recently reviewed by Gates²⁸ and Holmes.²⁹ As Holmes remarks, it makes little difference so far as practical considerations are concerned whether the inheritance of mental defect follows simple or complex Mendelian formulas, or whether it takes place according to the older conceptions of blending inheritance: "the fact that defective mentality is strongly transmitted is established beyond the possibility of sane objection."

As to the heritable basis of delinquency, a failure to meet a social situation according to accepted standards cannot be inherited as such, but there is a strong insistence on the part of biologists that the data collected thus far point definitely to the fact that certain traits are inherited, which dispose the individual to conduct regarded as delinquent. Holmes uses as the heading of his chapter on the inheritance of mental ability the statement from Karl Pearson: "We inherit our parents' tempers, our parents' conscientiousness, shyness, and ability as we inherit their stature, forearm and span."

From the point of view of social and moral hygiene, defective delinquents present two undesirable aspects. (a) They make vice and sexual non-conformity easy by their weak resistance. Their instinctive sex impulses and interests are subject to fewer inhibitions than is the case with the intelligent individual. Goddard³⁰ has pointed out the clinical commonplace that the emotional reactions of defectives are cruder, more primitive and direct than those of intelligent individuals. Although we may account for the weak resistance of the defective girl, this in no way minimizes the significance of her influence toward emotional unhealthiness in others. (b) As the potential mothers of potential delinquents they offer a large and important source of further delinquency. Not only must we consider the inferior mental endowment which they transmit to their offspring, but also the

²⁸ Gates, A. L., "The Inheritance of Mental Traits," *Psychol. Bulletin*, vol. 18, pp. 358-367.

actual home environment in which they raise these defectively endowed children. If the child is illegitimate and is abandoned, there are the alternatives of institutional care, care in a foster-home with public support (which is almost universally inadequate), or adoption (which seldom occurs with the child of a defective mother). If there has been a forced marriage, the father having married to avoid conviction on a charge of rape, the conditions immediately make for anything but a harmonious atmosphere in which to raise a child. If the parents marry of their own volition, the situation is little better. A mother with defective intelligence is often married to an individual of her own or of an inferior type. What chance has a defective child to grow up with acceptable standards when there is both a lack of intelligent supervision, and a constant example of actual non-conformity and lack of control in the home?

Deficiency as a cause of delinquency.—Here too we find wide divergences of opinion. On the one hand, there is the eugenicist urging that deficiency is perhaps the largest factor in delinquency. The early unweighted investigations finding such high percentages of defect among delinquents tended to emphasize this point of view. In support of it, too, we find a careful investigator like Goring²⁹ concluding that the "one vital mental constitutional factor in the etiology of crimes is defective intelligence"; also that "mental defectiveness is antecedent to his [the English convict's] environmental misfortunes." On the other hand, we find the sociological emphasis on environmental conditions. Hosts of investigators have reported that adverse conditions in home, school, and society are at the bottom of unsatisfactory conduct. Many presumptions and considerable evidence from the psycho-analytical school, with its emphasis on the importance of childhood, for adult sanity, have made for a wider investigation and a keener appreciation of external influences upon the mental make-up of the individual.

²⁹ Holmes, Samuel J., *The Trend of the Race* (1921), pp. 29-44.

³⁰ Goddard, H. H., *Psychology of the Normal and Subnormal*, (1919), pp. 157, 270-276.

³¹ Goring, C., *The English Convict* (1913), p. 263.

We find White³² urging that many failures which we have been attributing to defective heredity are unquestionably due to defective upbringing.

This deepening realization of the importance of external influences does not, however, minimize the importance of hereditary equipment. It really emphasizes it, just as a study of inferior mental endowments emphasizes the importance of environment. Intelligent and feeble-minded persons, as Goddard³³ points out, are by no means equally dependent upon environment. The intelligent person may, to a degree important to the individual, control his environment. The defective is dominated by it. And with reactions once established, the same lack of mental ability which made him succumb in the first place, makes it even more difficult for him to break the undesirable habits which his environment has imposed upon him.

It is a sterile pursuit to argue as to the relative causative significance of native endowment and environment in delinquents. The more defective the one, the more essential that the other be good if delinquency is to be avoided. The important generalization, from the point of view of this investigation, which can be gathered from the literature, is that the defective class is more disposed to delinquency through bad influences than the intelligent class and is less able to correct criminal habits once established.

Until we have had more, and more carefully checked, histories of defectives from different types of environments, we shall not be able to evaluate mental deficiency as a cause of delinquency. This paper represents an attempt to analyze the mental 'make-up' and the environmental condition, of a group of tested feeble-minded and borderline deficient who have been brought before the juvenile court because of social non-conformity.

³² White, William A., *The Mental Hygiene of Childhood* (1919), pp. 8ff.

³³ Goddard, H. H., *Juvenile Delinquency* (1921), pp. 6ff.

II. DATA ON THE ANTECEDENT CONDITIONS IN THE LIVES OF THE GROUP STUDIED

1. TYPES OF OFFENSE

In order that a girl may be brought before the juvenile court in San Francisco, it is necessary that someone file a petition in her behalf, giving in it the reasons, either in the form of specific charges, or as a blanket charge "in danger of leading an idle, dissolute, lewd or immoral life." The following table of offenses

TABLE 1.—TYPES OF OFFENSE; FIRST COURT APPEARANCE FOR DELINQUENCY

Mental age	III	V	VI	VII	VIII	IX	X	XI	Total	Per cent
Number of cases.....	1	1	2	14	13	38	75	102	246	.....
Sex offenses only.....	1	1	1	10	9	28	65	90	205	83.3
Other offenses plus sex offenses.....	0	0	0	1	2	5	3	5	16	6.5
First appearance not for sex offense—Later sex offense.....	0	0	0	0	0	3	3	3	9	3.7
Total sex offense cases.....	1	1	1	11	11	36	71	98	230	93.5
First offense, non-sexual.....	0	0	1	3	2	5	7	7	25	10.2
Stealing.....	0	0	0	0	2	5	2	3	12	4.9
Waywardness.....	0	0	1	3	2	4	7	7	24	9.8
Truancy.....	0	0	0	0	0	0	1	0	1	.4
Robbing mail.....	0	0	0	1	0	0	0	0	1	.4
Forgery.....	0	0	0	0	0	1	0	0	1	.4
Drunkenness.....	0	0	0	0	0	0	0	2	2	.8
Total non-sex offenses.....	0	0	1	3	2	2	4	4	16	6.5

is compiled from all data available at the time of each girl's first contact with the court for delinquency. The diagnosis of sex offense was made not on the basis of the charge preferred, but on the evidence of the physical examination plus the girl's statement to the probation officer, and to the district attorney, who handles the contributory cases which involve these girls. Under "other offense plus sex offense" are listed the cases where a girl who has been brought in for forgery, for example, and has admitted in

addition that she was practicing prostitution; or again, where the charge was truancy, and it was found that during non-attendance at school she had been involved in sex irregularities.

All but 6½ per cent of the group have had a history of sex irregularity, either at the first time of court contact or later. The first court appearance because of delinquency in 83.3 per cent of the cases was directly traceable to immoral sex-conduct.

As to the distribution of the non-sexual offenders among the different mental age groups, the numbers are too small to be conclusive, yet they indicate that non-sexual delinquency is less frequent with increasing intelligence.

The sexual irregularities include at the one extreme unwilling submission to criminal assault, and at the other commercialized immorality. As to the degree of the non-conformity, since much of the information obtained depends upon the girl's statement, the data unquestionably minimize the extent of the delinquency. Although an occasional girl gives an exaggerated story, making charges which are untrue, yet in a majority of cases she refuses to tell more than is forced from her by information from other sources. Particularly does she hold out against admitting prostitution, partly because it is more at variance with her standards, and partly because the admission increases the likelihood of institutional care.

What information we have, points to the fact that it is only among the higher grades of intelligence that prostitution is practiced independently. Several of the X-year group acknowledged working on a commission basis. One is immediately struck, in questioning these girls, by the bewilderment on their part because of all the ado. Many of them admit that they have "done wrong" and are truly distressed, but their sense of wrong-doing and their distress are like that of the young child, who realizes that he has done wrong only in proportion to the disapproval and unpleasantness which have followed his "wrong" acts. Any real appreciation on their part (with some few exceptions) of the social significance of immorality in their actions, or of the danger of venereal infections and the possibilities of pregnancy was lacking.

Not that they had not heard of these, for many were quite sophisticated, but the information had little or no significance for them. As is seen later in a study of home conditions, many were merely accepting the standards of their own homes.

In regard to the very high percentage of sex delinquency found in our group of mental defectives as compared with most investigations of female delinquents, we can but point out that in other groups, unselected as far as intelligence is concerned, sex offenders are reported as falling below the average in intelligence. In groups selected on a basis of sex offense, the intelligence of the groups is found to be below that of unselected delinquent groups. To take Miner's ³⁴ figures: McCord finds that 67 per cent of 88 sex offenders, not under arrest, are defective (mental age X years or below, on Goddard scale). Weidensall reports that, of the group of unmarried mothers investigated, 48 per cent are defective (mental age IX years or less). The Massachusetts State Commission reports 60 per cent of 300 prostitutes defective. The Virginia State Commission reports 56 per cent of 120 prostitutes defective. Fernald, Hayes, and Dawley ³⁵ find sex-offenders mentally inferior to other groups.

2. MENTAL STATUS OF THE GROUP

The following deductions may be drawn from table 2.

The ages range from 12 to 20, inclusive. The median age is 17. Of the entire group, 69 per cent are 15, 16, 17, or 18 years old.

There are 28 per cent having a mental age of IX years or less, and classified as "definitely defective." Seventy-five, or 30.5 per cent, have a mental age of X years, and are classified as "doubtful" or "probably defective." One hundred and two, or 41.5 per cent, have a mental age of XI years, and are classified as "borderline" or "possibly defective."

³⁴ *Op. cit.* (ref. 18), p. 159.

³⁵ *Op. cit.* (ref. 24), pp. 510-516.

TABLE 2.—DISTRIBUTION OF AGE AND MENTAL AGE

Mental age	III	IV	V	VI	VII	VIII	IX	X	XI	Total
Age 12.....					1					1
Age 13.....				2	4	3	4			13
Age 14.....	1				2	3	4	8		18
Age 15.....					2	1	8	17	13	41
Age 16.....					1	2	7	9	28	47
Age 17.....						1	2	19	23	45
Age 18.....					1	2	3	10	21	37
Age 19.....					2	1	4	7	8	22
Age 20.....			1		1		6	5	9	22
Total.....	1	0	1	2	14	13	38	75	102	246
Per cent.....	.4	0	.4	.8	5.7	5.3	15.4	30.5	41.5	100

A. AGE AND MENTAL AGE

The median age, falling as it does around 17 years, suggests that a majority of these girls become delinquent during the emotional years of early adolescence after being removed from the discipline and supervision which the public school has exercised. Dominant during this period, which is normally characterized by hyper-emotivity, are the interests which have a more or less unconscious sex implication, exaggerated interest in dress, sentimental stories, moving pictures, etc. At this age of abundant emotional energy, some sort of guidance is necessary if the girl is to avoid many unhappy situations. Our group with their limited interests and adaptability have fewer inner resources than normal girls. They are then in greater need of guidance from without. Irregular habits, particularly those with a rather intense emotional accompaniment, easily become established in adolescence and are carried over into adult life.

Figures from Fernald, Hayes, and Dawley's work³⁶ show the relationship between adult offense and adolescent sexual irregularities. Of three hundred and forty-eight offenders, 79.6 per cent had committed their first sex offense under the age of 22½

³⁶ *Op. cit.* (ref. 24), pp. 381, 511-512, 522, 559.

years; 62.7 per cent had committed their first sex offense under the age of 18½ years; 45.7 per cent has been involved during the period of 14½ to 18½ years. Holsopple,³⁷ in a group of two hundred and forty-nine predominantly adult offenders, finds 17.43 as the average age for the first sex experience. Fernald³⁸ also presents figures which are of interest in a consideration of our group, namely that there is a slight positive correlation between intelligence and the age of first sex offense. She finds, too, a negative correlation of $-.21 \pm .069$ between mental capacity and the number of years in prostitution.

B. RESULTS OF REEXAMINATION

Tables 3 and 4 give the data obtained from seventy-one re-examinations made on the different mental-age groups, arranged in table 3 by mental age, and in table 4 by actual age, at the time of the first examination.

With this limited number of reexaminations, the higher mental ages show more improvement than do the lower levels, with the highest peak of improvement (at least one year's mental advance) with individuals rating IX years at the first examination. Nine of the group advance so that the diagnosis of feeble-mindedness can no longer be maintained.

There also appears in this group to be a definite relationship between the actual age at the first appearance in court and the intellectual improvement, the peak being at 16 years. Nine of the twenty-two who gain at least a year, do so after they are 16 years of age. In several cases growth in intelligence is known to have ceased by 12 years. Of this reexamined group, 69.7 per cent do not change mental age with advancing chronological age. Within this small group the upper limit of intellectual development, as measured by our tests, varies as much as six years, the chances of early stoppage being greater at the lower mental and chronological levels.

A study of the individual records to find the basis of the change in mental ratings showed that six were distinctly psycho-

³⁷ *Op. cit.* (ref. 2), p. 11.

TABLE 3.—GROUPS ARRANGED BY MENTAL AGE

Mental age—First examination	VII	VIII	IX	X	XI	Total
Number of cases.....	7	6	12	24	22	71
Average gain per year.....	.21	.14	.21	.43	.42	.....
Number gaining one year.....	0	0	4	7	4	15
Number gaining two years.....	1	0	1	1	0	3
Number gaining four years.....	0	0	0	0	1	1
Number gaining five years.....	0	0	0	3	0	3
Less than a year gain.....	3	5	1	4	6	19
No gain, including those losing less than ½ year.....	3	0	5	7	6	21
Losing between ½ and one year.....	0	1	1	2	4	8
Losing one year.....	0	0	0	0	1	1
Total.....	7	6	12	24	22	71
Per cent showing one or more years gain.....	14.6	0	62.5	45.9	22.7	.....

TABLE 4. GROUPS ARRANGED BY ACTUAL AGE

Age	12	13	14	15	16	17	18	19	Total	Per cent
Average gain per year.....	.22	.19	.45	.24	.33	.67	.15	.07	.....	.....
Number gaining one year.....	0	1	0	4	7	3	0	0	15	21.1
Number gaining two years.....	0	0	2	1	0	0	0	0	3	4.2
Number gaining four years.....	0	0	0	0	0	1	0	0	1	1.4
Number gaining five years.....	0	0	1	0	2	0	0	0	3	4.2
Less than one year gain.....	2	3	2	2	3	4	3	0	19	26.8
No gain, including those losing less than ½ year.....	0	0	4	5	4	3	2	3	21	29.6
Losing ½ year.....	0	2	1	2	1	1	1	0	8	11.3
Losing one year.....	0	0	0	0	1	0	0	0	1	1.4
Total.....	2	6	10	14	18	12	6	3	71	100
Per cent showing one or more years gain.....	0	16.6	30.	35.6	50.	33.3	0	0	.....	.....

Rate of change:

Gaining at the rate of one mental year per life year..... 9 or 12.6 per cent
 Gaining at the rate of less than a year, etc. 35 or 49.3 per cent
 Girls not gaining and girls losing 27 or 38.1 per cent

pathic, yet no more so than many others in whom repeated examinations showed no improvement in intelligence rating; one was in a very bad emotional state at the time of the first examination; another was suffering from acute gonorrheal and syphilitic infections; and the ninth was a sluggish but persistent girl whose intellectual growth continued steadily until she was 20 years old. Eight of these nine were American-born, the other one had been in this country nine years, hence language difficulties do not play a part in these changed ratings. These few exceptions indicate the lack of finality of a single examination.

Since all members of this group are mentally defective, the defect which is readily recognizable in the younger children is necessarily more serious than that of the older girls.

Doll³⁸ has shown in his investigation of defectives that the lower grades reach their limit of intelligence at an earlier age than do the higher grades. Kuhlmann³⁹ has found the same tendency in his study of repeated examinations upon defectives but insists that all grades develop much longer than Doll, Stern, and others have supposed, and that the difference for different grades is not nearly so great as has been assumed. Kuhlmann also finds in his group of over six hundred institutional cases what is true of our small group, that a few (4.8 per cent) gain at a greater rate than the average normal rate and that some of these continue this rate long enough to make up their deficiency entirely.

C. PERFORMANCE OF THE GROUP IN TERMS OF RESPONSE TO THE INDIVIDUAL TESTS

Table 5 presents a comparison of those in our group having mental ages of IX, X, and XI years, with a group of delinquent girls (examined during the same period) whose mental ages were XII or over.

³⁸ Doll, E. A., "The Growth of Intelligence," *Princeton Contributions to Psychology* (1920), pp. 53-59.

³⁹ Kuhlmann, F., "The Results of Repeated Mental Re-examinations of 639 Feeble-minded over a Period of Ten Years," *Journal of Applied Psych.* vol. 5 (1921), pp. 195-224.

TABLE 5.—RESPONSE TO INDIVIDUAL TESTS IN TWO SELECTED GROUPS

Arrangement of Tests According to Goddard, 1911	I		II		III	
	Intelligent delinquents XII and over (265 cases)		Our group mental ages IX, X, and XI (215 cases)		Differences	
	Rank of tests	Per cent of passes	Rank of tests	Per cent of passes	Rank of Diff. I and II	Per cent Diff. I and II
	(1)	(2)	(3)	(4)	(5)	(6)
XII. 5 Problems of fact*.....	3	75.4	4	36.7	10	38.7
XII. 4 Suggestion lines*.....	2	73.5	8	50.6	15	22.9
XII. 3 Memory for sentence.....	1	59.2	1	10.2	4	49.0†
XII. 2 Definitions abstract words.....	5	88.6	5	39.5	3	49.1†
XII. 1 Repetition of 7 digits.....	4	75.8	3	28.3	6	47.5†
XI. 5 Dissected sentences.....	6	90.9	2	24.6	1	66.3†
XI. 4 Rhyming 3 words.....	10	96.9	9-10	54.4	8	42.5
XI. 3 60 words in 3 minutes....	7	93.5	7	45.1	5	48.4†
XI. 2 3 words in one sentence.	8-9	96.6	11	55.3	9	44.3
XI. 1 Sees absurdities.....	11-12	99.6	13	69.3	12	0.3
X. 5 3 words in two sentences	13-30	100.0	15	74.8	13	325.2
X. 4 Comprehension.....	13-30	100.0	14	73.4	14	26.6
X. 3 Repetition of 6 digits.....	11-12	99.6	12	66.9	11	32.7
X. 2 Designs from memory.....	8-9	96.6	6	40.0	2	56.6†
X. 1 Naming coins.....	13-30	100.0	19	87.9	19	12.1
IX. 5 Arranging weights.....	13-30	100.0	17-18	81.4	17-18	18.6
IX. 4 Naming months.....	13-30	100.0	24	96.7	24	3.3
IX. 3 Giving date.....	13-30	100.0	17-18	81.4	17-18	18.6
IX. 2 Definitions better than use.....	13-30	100.0	9-10	54.4	7	45.6†
IX. 1 Making simple change.....	13-30	100.0	16	78.6	16	21.4
VIII. 5 Repetition of 5 digits.....	13-30	100.0	20-22	96.2	21-23	3.8
VIII. 4 Finding value of stamps	13-30	100.0	20-22	96.2	21-23	3.8
VIII. 3 Naming days of the week	13-30	100.0	25	99.0	26	1.0
VIII. 2 Counts 20 to 0.....	13-30	100.0	24	98.6	24	1.4
VIII. 1 Compares simple objects	13-30	100.0	20-22	96.2	21-23	3.8
VII. 5 Names primary colors....	13-30	100.0	26-27	99.5	26-27	.5
VII. 4 Copies diamond.....	13-30	100.0	28-30	100.0	28-30	.0
VII. 3 Mutilated pictures.....	13-30	100.0	26-27	99.5	26-27	.5
VII. 2 Describes pictures.....	13-30	100.0	28-30	100.0	28-30	.0
VII. 1 Counts 13 pennies.....	13-30	100.0	28-30	100.0	28-30	.0

* Tests relatively more difficult for the more intelligent group.

† Tests relatively more difficult for the less intelligent group.

The following conclusions are suggested by the data given in table 5:

All the tests are more difficult for the group with mental ages, IX, X, and XI years, than for those rating XII or above, but there is considerable difference in the difficulty of the individual tests for the two groups.

Considered in terms of the difference in the ranks of the various tests for the more intelligent delinquents (Column 1) and for the less intelligent group (Column 5), we find that three tests stand out as relatively more difficult for those with a mental age of less than XII years than for those with a mental age of XII or more. These are (with a difference in rank of 5 or more places):

- (1) IX-2 Definitions better than use.
- (2) X-2 Drawing designs from memory.
- (3) XI-5 Putting together dissected sentences.

Two tests are relatively more difficult for the intellectually higher group of delinquents than for the lower groups:

- (1) XII-4 Suggestion lines.
- (2) XII-5 Problems of fact.

Seven tests show a difference of over 45 per cent in the percentages passed by the two groups. These are, in order of the degree of differences:

	<i>Per cent</i>
(1) Dissected sentences.....	66.3
(2) Designs from memory.....	56.6
(3) Definitions of abstract words.....	49.1
(4) Memory for sentences (26 syllables).....	49.0
(5) 60 words in 3 minutes.....	48.4
(6) Repetition of 7 digits.....	47.5
(7) Definitions better than use.....	45.6

An analysis of the tests most difficult for the defective group should indicate some of the qualitative peculiarities which characterize this group.

In a study of these girls, the examiner perhaps meets most frequently a lack of spontaneity and inventive facility in the difficult task of putting disconnected words into an intelligible sentence.

According to Binet the drawing of designs from memory is "a test of attention, visual memory, and a little analysis."⁴⁰ How much of the failure in this test is due to the factors singly or in combination is impossible to say, but a majority of these cases show a lack of ability to focus attention sharply, and there is a striking absence of any but the crudest analytical ability. That this visual memory test should be relatively more difficult than the tests of auditory memory for seven digits and for twenty-six syllables seems to be due to the fact that the memory reproduction of the designs takes more time and for most of them more mental effort. It is a common occurrence that the girl spending considerable time on the reproduction of the one design completely loses the other.

The memory for the twenty-six syllables, while actually the most difficult test for each group, is relatively much more difficult for the defective than for the brighter group (see table 5). This is a test of attention and auditory memory. Not only in tests of immediate memory do the defectives as a whole fail, but one finds a general paucity of information concerning facts with which they have repeatedly come in contact.

In the giving of as many words as possible in three minutes, there appeared the next greatest difference between the two groups. Only 45 per cent of our group were able to give the sixty required words. The most common types of failure for the group were first, a fair start which quickly "petered out" in rate, effort, and interest; and second, a slow poorly-associated sequence. Here we see evidence of a barrenness of associations and the above-mentioned lack of mental aggressiveness.

The repetition of seven digits offers difficulties previously discussed.

The giving of definitions better than use, actually and relative to the other group, proved a very difficult test. Here again we see the same meagerness of expression, the uninteresting, stereotyped manner of response characteristic of so much of their performance.

⁴⁰ Binet and Simon, translated by Kite, Elizabeth S., *The Development of Intelligence in Children* (1916), p. 60.

D. THE RANGE AND SCATTERING OF TESTS PASSED, MEASURED FROM THE BASAL YEAR

There is a positive relationship between scattering and mental age, the higher grades showing more scattering than the lower grades. This may in part be due to the scale used, as no change of age-level occurs between XII and XV years, which makes for an apparently wider scattering in the higher intelligence grades. (Mathews⁴¹ with one hundred girls found more scattering with the higher intelligence quotients.)

TABLE 6.—SCATTERING AND MENTAL AGE

Mental age	III	V	VI	VII	VIII	IX	X	XI	Total	Per cent	Revised Total	*Per cent
Scattering												
1 year.....	1	0	0	1	0	0	1	0	3	1.1	11	4.5
2 year.....	0	1	1	4	0	1	6	2	15	6.1	26	10.6
3 year.....	0	0	1	6	3	8	5	4	27	10.9	40	16.3
4 year.....	0	0	0	1	2	11	11	12	37	15.4	72	29.2
5 year.....	0	0	0	2	7	11	9	18	47	19.1	41	16.7
6 year.....	0	0	0	0	1	3	8	44	56	22.8	36	14.7
7 year.....	0	0	0	0	0	3	27	22	52	21.1	17	6.9
8 year.....	0	0	0	0	0	1	7	0	8	3.1	3	1.1
9 year.....	0	0	0	0	0	0	1	0	1	.4	0	.0
Total.....	1	1	2	14	13	38	75	102	246	100	246	100.
Median.....	1	2	2-3	3	5	4	6	6	5		4	

* As one test in the XV-year group appears much too easy for all groups examined, credit was not given here for a XV pass unless two tests were passed in this year group.

As to the significance of scattering, investigators hold different opinions. Doll⁴² states that "the feeble-minded child obtains his credit from a greater range of tests than does the child of normal intelligence." Curtis⁴³ reports more scatter among the feeble-

⁴¹ Mathews, Julia, "Irregularity in Intelligence Tests," *Journal of Delinquency*, vol. 6 (1921), p. 360.

⁴² Doll, E. A., "Scattering in the Binet-Simon Tests," *Training School Bulletin*, vol. 16 (1919), p. 100.

⁴³ Curtis, J. N., "Point Scale Examinations on the High Grade Feeble-minded and the Insane," *Journal of Abnormal Psychology*, vol. 13 (1918), pp. 77-118.

minded than among the normal, although less than among psychotics. Wallin⁴⁴ urges that irregularity is not indicative of subnormality. Mateer⁴⁵ inclines to the view that scattering is an important factor in the diagnosis of psychopathy. Mathews⁴¹ finds, as we do, psychopathic individuals showing marked scattering, while others equally unstable give fairly even performances. Wells⁴⁶ reports that scattering is less for constitutional psychopathy than for actual psychotics. Pressey⁴⁷ states that we must question the reliability of results when there is much irregularity.

E. INTERESTS

A lack of interests, rather than a dominance of vicious ones, is strikingly typical of our group. It is impossible to give statistically an accurate impression of this meagerness of interests. The following tabulation of the girls' answers to specific interest questions, while it in no sense can be considered as an index of real interest—since the tendency was to answer in the affirmative to make a good impression—yet it gives some indication of the point under discussion.

The data are divided into two sections: Vocational interests (tables 7 and 8), and non-vocational interests, largely recreational (table 9).

Only 48.7 per cent made any statement as to what they intended to do, while 62.1 per cent stated that they wanted to do some definite kind of work, regardless of the possibility of realization.

A comparison of expected and desired occupations shows housework coming first, with thirty stating that they expected to do it, as against nineteen who wanted to. Thirteen said that they expected to be nurses, as against thirty-one who said they wanted to be. Fourteen said that they expected to be stenographers, while

⁴⁴ Wallin, J. E. W., "The Phenomenon of Scattering in the Binet-Simon Scale," *Psych. Clinic*, vol. 11 (1917), pp. 179-195.

⁴⁵ Mateer, Florence, "The Future of Clinical Psychology," *Journal of Delinquency*, vol. 6 (1921), pp. 283-293.

⁴⁶ Wells, F. L., "Intelligence and Psychosis," *American Journal of Insanity*, July, 1920.

⁴⁷ Pressey, S. L., "Irregularity on a Binet Examination as a Measure of its Reliability," *Psych. Clinic*, vol. 12 (1919), pp. 236-240.

TABLE 7.—VOCATIONAL INTERESTS AS EVIDENCED BY REPLIES TO THE QUESTIONS "WHAT DO YOU WANT TO DO WHEN YOU ARE GROWN?" AND "WHAT DO YOU EXPECT TO DO?"

Mental Age	VII		VIII		IX		X		XI		Total		Per cent	
	Exp. to	Want to	Exp. to	Want to	Exp. to	Want to	Exp. to	Want to	Exp. to	Want to	Exp. to	Want to	Exp. to	Want to
Number of cases	13		12		35		73		99		232			
Expect or want to be, work in, or do														
Did not know what...	6	4	4	4	23	12	37	28	47	40	119	88	51.3	37.9
Married	1		3	2	2	4	5	5	4	5	15	16	6.4	6.9
Housework	3	3	2	1	6	4	9	6	10	5	30	19	12.8	8.2
Nurse				2		4	5	7		16	13	30	6.0	12.8
Stenographer	1	1		1		3	5	8	8	9	14	22	6.0	9.4
Store	1	1					6	3	6	4	14	8	6.0	3.4
Factory					2	3	1	2	3	4	6	9	2.6	3.9
Sewing				1	1	2	1	5	5	5	7	14	3.0	6.0
Sister	1					1			1	1	2	2		
Laundry							1	2			1	2		
Telephone operator						1	1		3	1	4	2		
Teacher					1		1	2			2	3		
Waitress		1							1	1	1	2		
Chambermaid									1	1	1	1		
Missionary									1	1	1	1		
Cashier								1				1		
Dance hall instructor.										1		1		
Singer								2				2		
Artist									1	1		1		
Poet									1	1		1		
Store owner		1										1		
Type setter										1		1		
Actress				1		1	1	2	1	1	2	5		
Total	13	13	12	12	35	35	73	73	99	99	232	232		

twenty-two said they wanted to be. Seven expected to do sewing, as against fourteen who wanted to do sewing. Fourteen expected to work in a store (wrappers and cash girls), while eight said they would like to do store work. The two positions which these girls might be able to hold under supervision, simple housework and wrapping in stores, had more expecting to do them than wanting to do them. Nursing and stenography (distinctly beyond their mental capabilities) were the two most desired fields according to their statements, though several realized their incapacity.

TABLE 8. RELATION OF GIRLS' STATEMENTS OF VOCATIONAL INTERESTS TO MENTAL CAPACITY

Mental age	VII and VIII	IX and X	XI
Per cent of mental group	10.7%	48.8%	42.7%
Nursing	9.6	38.7	51.6
Stenography	9.9	45.4	45.0
Housework	21.0	52.7	26.3
Sewing	14.3	50.0	35.0

With increasing intelligence the variety of expected and desired positions increased.

Those of higher mental capacity among the group show relatively less desire to do housework and sewing, and more inclination toward nursing and stenography, than do those of inferior intelligence.

Below are presented answers which the girls gave to a few of the questions asked to ascertain what they enjoyed doing. Here again the statements doubtless exaggerate the real interests.

As to reading, less than half of them do reading of any sort. The "Alger's" seem to lead the list of books. The moving-picture magazines come first in this type of reading. In the newspapers, "the funnies" and stories take precedence over the news, where any choice of reading is indicated.

Less than a third of the group play outdoor games, and only 8.6 per cent engage in organized play. Only eleven of the group belong to a gymnasium.

Two-thirds of them say that they do or have done sewing or fancy work of some description.

The moving picture seems to be the chief source of amusement for this group, 68.9 per cent claiming that they go at least once a week. A few have attended vaudeville performances (13.3 per cent).

TABLE 9. RECREATIONAL INTERESTS

Mental age	VII	VIII	IX	X	XI	Total	Per cent
Number of cases.....	13	13	35	73	99	232	
Do you read books?.....	5	3	12	35	50	105	45.3
Magazines?.....	0	0	12	26	43	81	34.9
Newspapers?.....	1	0	19	35	55	110	47.4
Belong to a gymnasium?.....	0	0	1	4	6	11	4.7
Play outdoor games?.....	6	5	9	24	29	73	31.4
Take part in athletics?.....	0	0	0	6	14	20	8.6
Sewing or fancy work?.....	6	5	22	47	76	156	67.2
Movies at least once a week?	6	5	26	52	71	160	68.9
Movies 2, 3 or more times a week?	6	2	12	19	45	84	36.2
Movies once a month or less often?	6	6	10	20	30	72	31.1
Vaudeville?.....	0	1	2	10	18	31	13.3
Music (including lessons, choir, etc.)?.....	1	1	0	15	13	30	12.9
Belong to a club?.....	0	0	1	3	8	12	5.1
Ever go to shows?.....	0	0	0	5	20	25	10.7

Only 5 per cent of the group belong to any club, Y. W. C. A., or similar organization.

Characteristic as the above-mentioned lack of mental spontaneity and initiative is in the typical clinical picture of a large majority of this group, we find equally characteristic a meagerness and drabness of interests. How much this condition is due to the inferiority of their native mental equipment, which dulls their alertness to the possibilities around them, and how much is due to the unstimulating and narrow character of their environment cannot be accurately judged. But certain it is that the two factors react upon each other and the individual, resulting in a colorless, uninterested, and uninteresting personality.

F. EMOTIONAL CHARACTERISTICS

The data here presented are the examiners' estimates. These rough classifications are based upon the observations made during a routine clinical examination, together with answers which the girls gave to various questions, and an analysis of their past behavior. There is a very complex array of characterizations. The table below represents an attempt to group this multiplicity.

TABLE 10. INFERIOR INTELLIGENCE AND EMOTIONAL ACTIVITY

Mental age	VIII and less	IX	X	XI	Total	Per cent
Emotional Groupings:	%	%	%	%	No.	
Group 1						
Hyper-emotivity	29.0	18.4	28.0	34.3	72	29.3
Group 2						
Stable, placid, nothing abnormal apparent	6.4	2.6	5.4	10.8	18	7.3
Group 3						
Hyper-suggestible, facile, irre- sponsible	25.9	55.3	46.6	36.3	101	41.1
Group 4						
Shut-in, stolid, apathetic, emo- tionally unexpressive	38.7	23.7	20.0	18.6	55	22.3
Total	100.0	100.0	100.0	100.0	246	100.0
Number of cases	31	38	75	102	246	

into presentable form. Four groupings are made and each person is thus arbitrarily classified on the basis of all the evidence. There are considerable qualitative differences within the groups. Group 1 includes all those where a hyper-emotivity seems to be the dominant characteristic, including constitutionally psychopathic individuals on the one hand, and unstable, easily excited, and confused individuals on the other. Group 2 includes those who present nothing particularly abnormal. Group 3 includes the

facile type where hyper-suggestibility, lack of stamina, and irresponsibility are characteristic. Group 4 includes those of the 'shut-in', stolid, apathetic, emotionally unexpressive make-up.

According to our groupings, the weak-willed, hyper-suggestible, irresponsible, those who exaggeratedly reflect outside influence, form the highest percentage. They represent emotionally superficial and rather colorless personalities. No significant relationship between this characteristic and mental age appears. The IX-year group includes the largest number of this type.

The group we have characterized as emotionally active came next in numerical importance.

The emotionally sluggish and inactive are less than one-fourth of the group. Here there is apparent a positive relationship between inferior intelligence and emotional activity. The lower the mental age the greater the emotional inferiority.

Only 7.3 per cent of the group were considered free from emotional abnormalities.

As a group, these girls, according to the foregoing classifications and upon our further observations of their qualitative characteristics, show a superficial and restricted emotional activity of a rather primitive type. The same drabness which was characteristic of their interests is exhibited here.

This lack of complex emotional expression in other lines appears in part responsible for the lack of inhibitions involving emotions related to sex activity.

3. PHYSICAL STATUS

The data here presented cover only a few salient facts taken from the medical records (two hundred and fifteen cases).

Numerically, carious teeth, gonorrhea, and diseased tonsils stand out as most important. Actually, gonorrhea is the most serious medical problem with these girls.

The venereal infections and pregnancies are relatively more frequent among the XI-year group than among the lower groups, which seems to indicate that the higher grades had become more seriously involved than the lower groups before being apprehended.

TABLE 11.—NUMBER AND PERCENTAGE IN WHICH PHYSICAL COMPLICATIONS OCCUR

Gonorrhea.....	73 or 33.9 per cent of the cases
Syphilis.....	20 or 9.3 per cent of the cases
Pregnancy.....	20 or 9.3 per cent of the cases
Diseased tonsils.....	70 or 32.6 per cent of the cases
Badly carious teeth.....	98 or 45.6 per cent of the cases
Pyorrhea.....	22 or 10.2 per cent of the cases
Impaired lungs.....	22 or 10.2 per cent of the cases
Active tuberculosis (lung).....	8 or 3.7 per cent of the cases
Eye conditions (strabismus, seriously defective vision).....	13 or 6.0 per cent of the cases
Heart condition (tachicardia, mitral stenosis).....	12 or 5.5 per cent of the cases
Bone-joint conditions.....	9 or 4.2 per cent of the cases
Epilepsy.....	3 or 1.4 per cent of the cases

Both the army figures and those quoted from Fernald in section I indicated that the venereal groups were characterized by mental inferiority. Our figures indicate that, within defective groups, the higher grades show the highest percentage of venereal infection.

TABLE 12.—CONDITIONS DUE TO SEX IRREGULARITIES ARRANGED ACCORDING TO MENTAL AGES

Mental age	VIII and less	IX	X	XI
Number of cases.....	21	35	69	90
	%	%	%	%
Gonorrhea.....	11.0	11.0	24.6	53.4
Syphilis.....	15.0	10.0	15.0	60.0
Pregnancy.....	10.0	10.0	30.0	50.0

As to the causative significance of inferior physical condition in the delinquency of the mentally inferior group, it seems reasonable to believe that poor health may result in lowered inhibitions and thus contribute to delinquency. On the other hand, the data would indicate that poor physical condition is often due to inability to observe health rules and in many cases results directly from the delinquent behavior.

TABLE 13.—SCHOOL GRADE AND MENTAL AGE

Mental Age	Num- ber of cases	Never attend- ing	No record	1	2	3	4	5	6	7	8	High school	Busi- ness	Median
III.....	1	1												
V.....	1	1												
VI.....	2			1	1									
VII.....	14	2			3	3	5	1						3-4
VIII.....	13		1		4	4	2	1	1					3
IX.....	38	2	1	1	2	3	11	9	8	1				4
X.....	75	1	4		1	3	15	18	16	14	2	1		5
XI.....	102		1			3	7	12	19	24	33	2	1	7
Total.....	246	7	7	2	11	16	40	41	44	39	35	3	1	6

TABLE 14.—MENTAL AGE, AND AGE WHEN LAST ATTENDING SCHOOL

Mental Age	Number of cases	Never attend- ing	No record	12	13	14	15	16	17	18	19	Median
III.....	1	1										
V.....	1	1										
VI.....	2											
VII.....	14	2		2	1	1	4	2				13-14
VIII.....	13			3	2	3	3	1				14-15
IX.....	38	2	1	1	5	9	10	8				14
X.....	75	1	4	3	7	15	29	11	3	2	1	15
XI.....	102		4		11	22	32	22	6	4		15
Total.....	246	7	11	9	28	52	78	44	9	6	1	15

4. SCHOOL RECORDS

A study of the records of previous school attendance, presented in tables 13-15, may be summarized as follows:

Seven of the group never attended school.

The median school grade for the group is six.

The median age for leaving school was 15, the limit for compulsory attendance. The significant fact, however, is that a third of the group leave school before the compulsory age limit is reached. The lower mental grades leave earlier than those of higher intelligence.

Eighty-five per cent are retarded four or more years scholastically according to grade comparisons. Since "only two years in a grade" is a rule of promotion, this figure minimizes school failure.

Although not presented here in numerical form, the reasons given for leaving school were "to go to work," "didn't have to, I was 15" or "didn't like it." An investigation of many of those who left to "go to work" showed that for a considerable time after leaving school they were not employed. A high percentage of them, regardless of the reason they assigned, left because they were glad to get away from failure, with which they were constantly embarrassed in the schoolroom.

The fact that all but a negligible percentage (less than 3 per cent) have a record of school attendance points clearly to the schools as the most important place for the early recognition of mental deficiency and peculiarity.

TABLE 15. AGE AND SCHOOL GRADE: MEDIAN SCHOOL GRADES FOR DIFFERENT AGES

Age	X	XI	For group
12	3	5	3
13	4	6	4
14	4	7	6
15	5	8	7
16	6	8	7-8
17	6-7	7	7
18		7	7
Median for group			6

The scholastic records are in accord with the conclusion that the usual methods not only produce resentment, but also fail to give the necessary practical training.

5. OCCUPATIONAL RECORDS

An analysis of the data in tables 16-18 leads to the following conclusions:

The percentages who have done remunerative work increase with intelligence.

The most frequent types of work are: housework, 37.4 per cent of the working group; factory work, 32.7 per cent; department store work (cash girls and wrappers), 10.0 per cent.

TABLE 16. DIFFERENT TYPES OF WORK IN LAST JOB

Mental age	III	V	VI	VII	VIII	IX	X	XI	Total	Per cent
Number of cases.....	1	1	2	14	13	38	75	102	246	
Cases with no record of work.....	1	1	1	9	7	20	23	13	75	30.4
Cases with record of work.....	0	0	1	5	6	18	52	89	171	69.6
Housework				5	4	9	21	25	64	37.4*
Factory work.....					1	8	16	31	56	32.7
Department store work.....							4	13	17	10.0
Laundry work.....					1		4	5	10	5.8
Waitress.....						1	3	5	9	5.2
Dance-hall instructor.....							1	4	5	2.9
Telephone work.....							2	1	3	1.8
"Movie" usher.....								2	2	1.2
Work with a cleaning company.....								2	2	1.2
Work in cafeteria.....							1	1	2	1.2
Work in hop fields.....			1						1	.6

* Percentages here and below in this table are based on 171 cases.

The percentage of those doing housework decreases as intelligence increases.

With increasing intelligence, there appears to be an increase in the percentage doing factory work.

A slight increase in the varieties of work occurs with increasing intelligence.

The median wage is higher for the group having a mental age XI than for the groups of lower mental age.

The percentage receiving less than a living wage, as fixed by the Industrial Welfare Commission, decreases with increasing intelligence.

TABLE 17.—PERCENTAGE FOR DIFFERENT OCCUPATIONS AT DIFFERENT MENTAL AGES

Mental age	VII and less	VIII	IX	X	XI	Per cent for all mental ages
Without record	66.7	50.0	52.6	30.6	12.7	30.4
With record	33.3	50.0	47.4	69.4	87.3	69.6
Total	100.0	100.0	100.0	100.0	100.0	100.0
Housework	83.3	66.6	50.0	40.0	28.1	37.4
Factory work	0.0	16.6	44.4	30.8	34.8	32.7
All other work	16.7	16.6	5.6	29.2	37.1	29.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

The median wage received rises during the years from 1914 to 1918, inclusive.

The percentage receiving less than the minimum cost of living shows a decrease with each succeeding year, 1914 to 1918, inclusive.

The most striking fact lies in the size of the wage, the median for the group being \$6.50 per week. The percentage getting \$10.00 per week or less, 86.3 per cent, is much greater than the 53.3 per cent which the Commission found for women and girls in general. Another fact is that these girls have almost exclusively worked in those industries which showed the highest percentage of low wages until the minimum wage orders forced them higher.

Our data are very inadequate as to wages paid for housework. Many of the girls worked in foster homes 'for their keep' with an occasional donation. Of those who did full-time work the median wage was \$10.00 a month in addition to board and room. The highest wage that any girl had received up to the time she came to the court was \$22.50 per month.

TABLE 18.—OCCUPATIONAL RECORDS AND WEEKLY WAGES,* BASED LARGELY UPON THE UNVERIFIED STATEMENTS OF THE GIRLS

Mental age	VIII	IX	X	XI	Median	Per cent getting less than \$10.00
Years—						
1914.....		\$6.00	\$6.50	\$6.00	\$6.00*	100.0
1915.....		6.50	6.00	6.00	6.50	92.3
1916.....		6.00	6.50	7.00	7.00	88.8
1917.....		6.00	6.00	7.00	7.00	88.0
1918.....	\$7.00	7.00	7.00	8.00	7.50	77.7
Medians.....		6.50	6.50	7.50	6.50	
Per cent getting less than \$10.00.....	100.0	100.0	89.2	81.3		86.3

* Wages in all work other than housework, in terms of median weekly wage.

NOTE.—In 1914 the Industrial Welfare Commission of California found "approximately \$10.00 to be the lowest living cost for a self-dependent woman consistent with the health and welfare of the worker."⁴⁸ This commission also reported that during the years 1915 and 1916, 53.3 per cent of the women and girls working received less than \$10.00. In the manufacturing industries, laundries, and stores, the percentages receiving less than \$10.00 were higher, ranging from 66 per cent to 78 per cent.

The girls' statements appear so unreliable in respect to the length of time to a job that no tabular presentation is attempted. The girls who did housework presented more examples of continuous employment than the girls doing other work; we find a few doing housework in the same home for periods as long as a year or more. Very few indeed of the others worked at factory or store for so long a period. They have great difficulty in remembering all the places in which they have worked. Record after record shows many jobs, but none longer than a month. These short and irregular employments seem due, on the whole, more to the girls' inability to do work or abide by the regulations than to the casual type of job. Even under the minimum-wage rulings, this brief and irregular employment affects the wage received, because many of the girls do not stay with the job long enough to get more than the 'learner's' wage, which is considerably smaller than that of the experienced worker.

⁴⁸ *Third Biennial Report of the Industrial Welfare Commission of California*, 1919, p. 8.

As to the types of work, our findings agree in the main with those of other investigators. Fernald,⁴⁹ in her delinquent group, finds that those doing domestic work have lower intelligence than those doing other types of work. Clifford⁵⁰ finds among two hundred industrial girl workers who were delinquent wards of the San Francisco Juvenile Court, that factory and laundry work drew largely from the defectives of her group. In our defective group, 70 per cent were employed at domestic or factory work.

In the matter of wages, we find similar agreement among investigators as to the inferiority of the wage received. Davis,⁵¹ in 1913, reporting upon one hundred and ten mentally inferior prostitutes, shows a median weekly wage of \$4.00 before entering prostitution. In the defective, non-delinquent group which she followed (three hundred and fifty boys and girls from an ungraded school), Farrel,⁵² in 1915, reports that only 28 per cent were earning \$5.00 or more a week. Fernald⁵³ finds no significant correlation between mental capacity and wage in domestic service but finds a positive correlation, $+ .31 \pm .07$ between mental capacity and industrial wage. Although economic status is inferior, yet many defectives can earn enough to be partially self-sufficing, if given proper practical training and supervision. In considering plans for the permanent care of this group, these facts should be considered before accepting a rigid policy of isolation.

As to the importance of economic insufficiency in contributing to delinquency we have no direct evidence. We are inclined to believe that there are common factors which make both for delinquency and for economic inferiority, and that these factors include inferior intelligence, unsatisfactory home conditions, and inadequate training.

⁴⁹ *Op. cit.* (ref. 24), pp. 500ff.

⁵⁰ Clifford, Ruth A., "Mental and Physical Traits Demanded by Employers of Unskilled Girls," M.A. Thesis, MS, Univ. of Calif., 1921, p. 57.

⁵¹ Davis, K. B., in Kneeland G. J., *Commercialized Prostitution in New York City* (1913), p. 210.

⁵² Farrel, Elizabeth R., "A Primary Report on the Careers of Three Hundred Fifty Children Who Have Left Ungraded Classes," *Journal of Psycho-aesthetics*, vol. 20 (1915), pp. 20-26.

⁵³ *Op. cit.* (ref. 24), pp. 504ff.

6. NATIONAL GROUPS

There are proportionately fewer foreign-born in our delinquent group than in the general female population of San Francisco. Of this foreign-born group, the Spanish-American mixture furnishes nearly half, 42.8 per cent more than their proportion in San Francisco. The Italians contribute 19.0 per cent of this foreign-born group, which is 2 per cent more than they contribute to the total foreign-born population of San Francisco. On the other side, the Irish furnish 10.7 per cent less than their quota.

TABLE 19.—DIFFERENT MENTAL-AGE GROUPS ARRANGED ACCORDING TO NATIVITY.

Mental group	American born	Foreign born	Un- known	Total
Idiot (M. A. III years or less).	1 (Jewish)	0	0	1
Imbecile (M. A. IV-VII years).	15 (2 Indians, 1 Jewish, 1 Negro)	2 (1 Mexican) (1 Colombian)		17
Mental age VIII and IX	34 (1 Negro)	15 (1 Canadian, 3 Spanish, 5 Span.-Amer., 4 Italian, 1 Filipino, 1 French)	2	51
Mental age X.....	58 (2 Jewish, 1 Negro)	13 (2 Canadian, 6 Span.-Amer., 3 Italian, 2 Portuguese)	4	75
Mental age XI.....	87 (2 Jewish)	12 (2 Canadian, 6 Span.-Amer., 1 Spanish, 1 Italian, 1 English, 1 Roumanian)	3	102
Total.....	195	42	9	246

Per cent

NOTE.—American-born of this delinquent group, 195 or	82.3
American-born of total female population of San Francisco	63.0
Difference: Plus	19.3
Foreign-born of this delinquent group, 42 or	17.7
Foreign-born of total female population	37.0
Difference: Minus	19.3

In contrast with the foregoing, those of foreign-born parentage contribute more than their quota by 12.1 per cent. The Italians furnish 23.4 per cent, the Spanish-Americans come next with 17.5 per cent, the Irish third with 14.6 per cent, Germans fourth with 6.6 per cent. Relative to their proportion in the general foreign-born-parent population, the Italians come first with 21 per cent more than their share, the Spanish-Americans second with 12 per cent more than their share. On the other side of the scale we find that, although the Germans furnish 6.6 per cent of the delinquent group of foreign parentage, this is 13.9 per cent less than their quota. The English, too, furnish less than their quota.

TABLE 20.—THE FOREIGN-BORN OF THE DELINQUENT GROUPS, COMPARED WITH THE FOREIGN-BORN OF THE GENERAL FEMALE POPULATION OF SAN FRANCISCO. (Forty-two cases.)

Nationality	Number of girls	Per cent of group	Per cent in general female population	Difference
Spanish-American mixtures (Mexico, South America, Pacific Islands).....	20	47.6	4.8	+42.8
Spanish.....	4	9.5	1.7	+ 7.8
Canadian.....	4	9.5	5.0	+ 4.7
Portuguese.....	2	4.7	.5	+ 4.2
Italian.....	8	19.0	17.0	+ 2.0
Roumanian.....	1	2.3	.4	+ 1.9
French.....	1	2.3	4.9	- 2.6
English.....	1	2.3	7.2	- 4.9
Irish.....	1	2.3	13.0	-10.7
All other nationalities.....	0	0	45.5	

Regarding women delinquents in New York ⁵⁴ the same condition is reported, namely, that the foreign-born contribute less than their proportion of the general population while those of foreign-born parentage contribute more than their proportion (13.9 per cent as compared with our 12.1 per cent). Two explanations of this fact may be offered: first, that the foreign-born of the general population are older than those of foreign parentage and the probabilities for delinquency are less; and, secondly, that the children, with the adaptability of youth, adjust themselves more

⁵⁴ *Op. cit.* (ref. 24).

easily than their foreign-born parents to the externals of American life; they have greater opportunity for education and therefore develop different standards. Friction naturally occurs and the parents, thus doubly handicapped, cannot enforce discipline.

TABLE 21.—NATIVITY OF PARENTS OF DIFFERENT MENTAL GROUPS.

Mental group	Parents native-born	Parents foreign-born	Parents unknown	Total
Idiot.....	0	1	0	1
Imbecile.....	7	10	0	17
Mental age VIII and IX	8	38	1	51
Mental age X.....	27	39	5	75
Mental age XI.....	46	49	7	102
Total.....	92	137	17	246

Per cent

NOTE.—American-born, 92 or	40.1
Native whites of native parents in San Francisco population.	52.2
Difference: Minus	12.1
Foreign-born, 137 or	59.9
Foreign-born parentage in general San Francisco white population	47.8
Plus	12.1

Another aspect of the situation concerns those national groups which contribute more than their share of defective delinquents—the Italian, and Spanish-American, contributing actually and relatively more than the other national groups. In regard to the undue proportion of delinquency among them, both groups are of a racial derivation which is popularly conceded to be more active emotionally than North European stock. It is quite possible that emotional differences are as important in causing failure to conform socially in a community in which an Anglo-Saxon emotional reserve dominates accepted standards, as are more purely intellectual differences. These emotional differences, plus the fact that the warmer climatic conditions whence they come make for earlier physical maturity, are responsible for

different standards governing sexual relationships. As to their undue mental inferiority, we find the same condition holding true throughout the school population in San Francisco, that is, Italian and Spanish mixtures comprise the highest percentage both of scholastic failures, and of failures according to accepted mental-test standards. Even after making due allowance for language

TABLE 22. NUMBER OF DELINQUENT GIRLS OF FOREIGN PARENTAGE, RELATIVE TO THE TOTAL FEMALE POPULATION OF FOREIGN PARENTAGE IN SAN FRANCISCO.

Nationality	Number of girls	Per cent of group	Foreign female population of San Francisco of the nationality	Differences
Italian	32	23.4	11.4	+21.
Spanish-American	24	17.5	.7	+12.0
Spanish	4	2.9	.5	+ 2.4
Portuguese	3	2.2	.2	+ 2.
French	8	5.8	3.8	+ 2.
Canadian	6	4.4	3.4	+ 1.
Roumanian	1	.7	.1	+ .6
Polish (Jewish)	1	.7	.1	+ .6
Norwegian	3	2.2	1.9	+ .3
Hungarian	1	.7	.5	+ .2
Swiss	2	1.5	1.6	- .1
Russian (Jewish)	2	1.5	2.9	- 1.4
Austrian (Jewish)	1	.7	2.7	- 2.
English	2	1.5	5.9	- 4.7
Irish	20	14.6	22.8	- 8.2
German	9	6.6	20.5	-13.9
Mixtures	18	13.1		
Other nationalities	0	0	21.0	
Total	137	100.0	100.0	

difficulty, the condition still remains. But one feels after studying these individuals that any broad statement as to general mental defect among them does not tell the whole truth. Doubt is felt as to the justice of classifying, as defective, stock that appears undeveloped rather than deteriorated. One is repeatedly struck by the difference of mental make-up of two individuals, objectively presenting a similar intelligence rating. For example, a girl of Anglo-Saxon derivation with a mental age of IX years is of a

distinctly different type from that of the girl of sluggish South Italian peasant derivation with the same mental age. We must watch for a generation, at least, the changes in intellectual growth in these people who appear undeveloped, before we can make any generalization as to the incidence of real mental defect among them.

7. HOME CONDITIONS

a. *Occupations of parents.*—The occupations of both the mothers and the fathers, as summarized in tables 23 and 24, are largely of the unskilled variety: 60 per cent of the occupations being unskilled, in the case of the fathers, and 90 per cent in the case of the mothers. Furthermore, a comparison of our group of

TABLE 23.—OCCUPATIONS OF THE FATHER, CLASSIFIED ACCORDING TO THE MENTAL RATINGS FOUND FOR THE DIFFERENT OCCUPATIONAL GROUPS IN THE ARMY.⁵⁵

Mental age	Number of cases	Army rating of occupational groups					
		A	B	C +	C	C -	Un-classified
III.....	1	0	0	0	0	1	0
V.....	1	0	0	0	0	1	0
VII.....	4	0	0	0	0	4	0
VIII.....	6	0	0	0	2	3	1
IX.....	20	0	0	0	4	14	2
X.....	36	0	0	2	8	18	8
XI.....	54	0	0	4	20	19	11
Total.....	122	0	0	6	34	60	22

NOTE.—The twenty-two cases which did not correspond to any occupation listed in the army figures would not alter the above proportions materially. These were: nine fishermen, five farmers, one night watchman, one barkeeper, one vaudeville actor, one running a small and very inferior boarding house, one working in a partly-owned 'notions' store, one mending fishermen's nets, one a private in the regular army, one a captain* in the regular army; the largest single group were day laborers ("any kind of work"); stevedores, classified as unskilled laborers, came next in frequency.

⁵⁵ National Academy of Sciences, *Memoirs*, vol. 15, chap. 15. C- corresponds to mental age of 10 to 12.9. C corresponds to mental ages of 13 to 14.9. C+ corresponds to mental ages of 15 to 16.4.

* The captain was not an officer during the war, hence his rating is somewhat doubtful. He should probably be included in one of the highest groups.

fathers with the army occupational groups shows that none of our group falls in classes A or B (the two highest groups), only 6 per cent fall in the third group C+, while 34 per cent fall in group C', and 60 per cent in group C'-. We seem justified, then, in the inference that as a group our fathers are intellectually inferior.

Of our group of mothers, forty-seven work away from home, which, on the face of it, implies a lack of a mother's supervision of the children.

TABLE 24. OCCUPATIONS OF THE MOTHERS*

Factory workers (bag, candy, cigarette factories and canneries).....	20
House-worker (thirteen by the day, or by the month).....	14
Laundry worker.....	6
Seamstress (two of these do sewing at home).....	5
Janitress.....	1
Chambermaid.....	1
Hairdresser.....	1
Vaudeville performer.....	1
Total.....	49

Unskilled work, which, as we have seen, determines the family income for our group, has two characteristics, irregularity of employment and inferiority of wages, making for insufficient income. Although a full and accurate record was not obtained of the wages of the father at the time of his daughter's first offense, the records obtained showed only two fathers earning more than \$100 a month, and one of these was not contributing to the girl's support. Considerably less than half of the families had any income from the father.

We find in other investigations of delinquents this same predominance of economic inferiority in the home. Breckinridge and Abbott⁵⁶ found that 68.8 per cent of their Juvenile-Court girls came from families that were "very poor and not normally self-sustaining." Fernald, Hayes, and Dawley⁵⁷ find that 41.4

* Housewives and prostitutes excluded; forty-seven of the forty-nine mothers worked away from home.

⁵⁶ Breckinridge, Sophroniska P., and Abbott, Edith, *The Delinquent Child and the Home* (1912), pp. 70-72.

⁵⁷ *Op. cit.* (ref. 24), p. 210.

per cent of their group of adult offenders have had homes during childhood which would fall into this non-self-sustaining class. Investigators seem to agree that there are apparently common factors in the home which make for both delinquency and economic insufficiency.

The fact should be noted, however, that our group is a selected one, in that the defective and delinquent children from homes of higher economic status are rarely handled by the Juvenile Court, but are usually dealt with in other ways.

TABLE 26.—HOME CONDITIONS IN DIFFERENT MENTAL AGES *

Mental age	VII and less	VIII	IX	X	XI	Total	Average
Number of cases.....	18	13	38	75	100	244	
Homes broken for any cause.....	88.8	84.6	76.3	89.3	80.0	.....	83.3
Homes broken by death..	88.8	61.5	50.0	62.6	46.0	.....	55.7
Homes broken by deser- tion.....	38.8	50.7	18.4	21.3	18.0	.....	21.2
Homes unbroken.....	11.2	15.4	23.7	10.7	20.0	.....	16.7
Known sexual delinquen- cy or crime in the home	38.8	46.1	34.2	46.6	36.0	.....	39.7
Known delinquency or crime in the home (total).....	44.4	53.8	73.6	60.0	63.0	.....	61.8
Alcoholism in the home...	44.4	23.0	31.5	30.6	23.0	.....	28.2

* Percentages based on the number in each mental-age group.

b. *Social Conditions and Standards.*—Our investigations of social conditions, as outlined in tables 25 and 26, show that 83.3 per cent of the group come from homes which were broken at the time of the first court appearance. Broken homes predominate in each mental group, there being no marked difference in the different mental levels. Fifty-five and seven-tenths per cent of the homes were broken by death. Both parents were dead in 14.8 per cent. The mother was dead in 37.2 per cent and the father in 32.3 per cent of the cases. Thus, in over half of the cases, either the normal economic support of the family had been removed by the death of the father, or the normal home super-

vision was gone through the death of the mother. (N. B. — These figures are perhaps smaller than the actual number dead, as no record regarding death could be obtained in the case of parents who had deserted.) Twenty-one and two-tenths per cent of the homes had been broken by desertion. In twelve cases, 4.9 per cent, both parents had deserted; 6.9 per cent of the mothers had deserted, as against 19.2 per cent of the fathers. The percentage of desertions is higher among the parents of those with the lower mental ages.

Only 16.7 per cent of the homes were unbroken. An analysis of these forty-one unbroken homes shows that there were only six which were without drunkenness, immorality, crime or delinquency, insanity, or brutality.

In 61.8 per cent of the homes, there was a record of delinquency or crime on the part of a parent or sibling. Thus over half of these girls were thrown into actual contact with vice and delinquency in their homes.

The percentage of delinquency and crime, on the whole, shows an increase with increasing intelligence.

In 37.7 per cent of the homes, there is a record of sexual delinquency on the part of one or more members of the family. Actually, most of this 37.7 per cent was contributed by the mothers and sisters, not that there was necessarily more irregularity on their part, but that sexual irregularities on the part of a father or brother did not receive legal recognition unless a charge of rape was preferred. With three exceptions, report of the father's sexual delinquency was based on conviction for rape. In five of the eleven convictions for rape, the crime was committed by the father against his own daughter.

No positive relationship exists between sexual delinquency on the part of the parents or siblings and the mental status of the girl.

A further fact which the home situation presents, and which has a direct bearing on the lack of sexual inhibition on the part of the girls, is overcrowding and the resulting familiarity of the girl with sexual activities in others, whether illicit or otherwise. The homes of this group were so strikingly overcrowded that little privacy was possible, had it been thought of.

Drunkenness, while perhaps actually losing numerical significance as a factor in producing bad home conditions, unquestionably has had a significant influence in many of these homes. Twenty-eight and two-tenths per cent of our group had one or both parents chronically alcoholic—alcoholic to the extent that the matter was reported for judicial consideration of some sort, either involving arrests or commitments to a state hospital for the “drink cure.” Both in lowering already low standards and in dissipating the already inadequate income, it obviously played a considerable part.

The 18.8 per cent of tested deficiency in parents or siblings (see table 25) represents in no sense the proportion of real defect that exists in these families. Testing occurred only where some deficiency brought the individual before the court.

Over ten per cent of the group were married at the time of the first court appearance; all but one of these were involved in sex offenses. Marriage in this group had not prevented illicit sex relations. Only three of the twenty-six were living with their husbands, and two of these, on their own admission, had been practicing prostitution; the other was promiscuous, but denied receiving money. The husbands, although not tested, appeared to be as inferior mentally as were the girls, and in several cases were brutal and vicious.

The home conditions of our group are markedly inferior to those of delinquents not selected on a basis of their mental inferiority. Fernald, Hayes, and Dawley⁵⁸ report that, with their group, 20 per cent had “good” homes; that is, the girl’s “surroundings were such that there is every chance that she should have good moral standards.” And 46.7 per cent of their group have “fair” homes, “where for the most part, the members of the immediate family have a reputable standing in the community.” In contrast with this, in 61.8 per cent of the homes in our group there is a record of delinquency or crime. These same investigators report a positive correlation of $.31 \pm .053$ between intelligence and an estimate of the homes in terms of

⁵⁸ *Op. cit.* (ref. 24), p. 212.

economic condition, moral standards, and parental supervision. The correlation between intelligence and economic status was the same, $.31 \pm .053$. This means that the defectives represented distinctly the inferior homes of their group. Our figures, the figures of Fernald, Hayes, and Dawley, the army findings, the studies of Kornhauser,⁵⁹ Yerkes,⁶⁰ Bridges,⁶¹ and others, all indicate the high correlation which exists between economic status and intellectual status. We seem justified, on the basis of the poor economic status of the parents of our group, in assuming their mental inferiority as a group.

III. DISPOSITION OF THE CASES, AND SUBSEQUENT HISTORY

1. GENERAL STATEMENT

The general policy of the San Francisco Juvenile Court and probation force is against institutional care when there is a probability or possibility that the individual may get along without it. It is based upon the opinion that every effort should be made toward helping boys and girls to conform in the community in which they, as adults, must live, rather than toward corrective training in the artificial atmosphere of an institution. How far this policy is a constructive one with defective delinquent girls, and what the probabilities are for acceptable conduct in the community, the following section discusses. The possibilities of disposition are:

- a. The dismissal of the petition with more or less friendly advice.
- b. Transfer to another community which is legally responsible for the minor in question.

⁵⁹ Kornhauser, "The Economic Standing of Parents and the Intelligence of their Children." *Journal of Educational Psychol.*, vol. 9 (1918), pp. 159-164.

⁶⁰ Yerkes and Anderson, "The Importance of Social Status as Indicated by the Results of the Point Scale Method of Measuring Mental Capacity," *Journal of Educational Psychol.*, vol. 6 (1915), pp. 137-150.

⁶¹ Bridges and Coler, "The Relation of Intelligence to Social Status," *Psych. Review*, vol. 24 (1917), pp. 1-31.

c. Placement under the care of some interested and responsible individual.

d. Placement under the care of a probation officer, the girl

1. to remain in her own home, or
2. to be placed in a boarding home, or
3. to be placed in a girls' club.

e. Placement on the "continued calendar," the matter of the girl's conduct and program to be brought up for consideration from time to time. Nominally the probation officer is not responsible, but actually she tries to watch the case.

f. Institutional care. This type of commitment involves a decision as to the choice of institution. Although there is overlapping of types of inmates, yet there is a tendency toward one type predominating in each of the institutions which are available to the San Francisco Juvenile Court. An effort is made to avoid, as much as possible, the mixing of incipient offenders with recidivists. Religious affiliations must be considered, as must likewise the facilities for the effective training of those of different intellectual capacities. A consideration must be had for the institution's equipment to handle venerably infected and pregnant girls.

There is only one institution in California at present equipped to handle defective girls. The Sonoma State Home, as it is called, is allowed to grant paroles at the option of the superintendent. Thus, while the care may be of a permanent nature, the institution may be used as a temporary expedient. Its capacity is wholly inadequate to house those applying for admission. Because of lack of room and because of the statute governing admissions, a judge cannot commit individuals directly to this institution. He must await an opening. This fact results in the long institutional stay of many feeble-minded girls in reformatories or semi-reformatories, who, had there been an early opening, would have been committed directly to the state institution for the feeble-minded.

TABLE 27.—DISPOSITION MADE AT THE TIME OF FIRST COURT-APPEARANCE

Mental age	Number of cases	Released or transferred	Probation or continuance	Failure on probation	Success on probation	Institutional care
III.....	1	1				
V.....	1					1
VI.....	2		1	1		1
VII.....	14	1	2	2		11
VIII.....	13	1	2	2		10
IX.....	38	10	17	16	1	11
X.....	75	10	52	50	2	13
XI.....	102	18	65	56	9	19
Total.....	246	41	139	127	12	66
Percentage.....		16.7	56.5	91.4	8.6	26.8

TABLE 28.—RELATION OF INTELLIGENCE TO PROBATION AT FIRST COURT ORDER AND THE FREQUENCY OF FAILURE OR SUCCESS ON PROBATION

Mental age	Per cent given probation	Frequency of probation order	Frequency of success on probation
VII.....	14.3	1 in 7	0 in 2
VIII.....	15.3	1 in 6.5	0 in 2
IX.....	44.7	1 in 2.3	1 in 17
X.....	69.1	1 in 1.4	1 in 26
XI.....	65.7	1 in 1.6	1 in 7.2

TABLE 29. DISPOSITION BY YEARS

Years	Number of cases	Released or transferred	Probation and continuance	Probation	Con- tinuance	Institu- tional care
1914.....	33	12.1%	69.7%	69.7%		18.2%
1915.....	48	18.8	60.7	60.7		14.6
1916.....	60	15.0	65.0	63.3	1.7%	20.0
1917.....	44	9.2	36.3	27.2	9.2	54.5
1918.....	61	24.6	47.5	26.3	21.5	27.9
Total.....	246	16.7	56.5	49.2	7.3	26.8

2. FIRST COURT ORDER AND PROBATION RECORDS

In tables 27-29 it may be seen that the proportion of those put on probation by first court order increases with intelligence; only one-seventh of the VII-year group were put on probation, while about two-thirds of the X and XI-year groups were given this court order. Furthermore, the percentage of probation failures for the entire group is 91.4 per cent, an extremely high figure when we consider that the order of probation was distinctly selected for the cases for whom there was thought to be a probability of success. Only five whose mental ages were below IX years were put on probation; all were failures. The chances were one in seventeen that the girl with a mental age of IX years would not be a repeater.

The X-year group, with chances for success one in twenty-six, presents greater difficulty than the XI-year group. There is a marked difference between these two groups, the chances that the latter will avoid detection being distinctly greater.

The percentage placed on probation increases with the successive years, as does also the percentage given institutional commitment. Similarly the number placed on continuance, which means a more or less informal 'follow-up,' increases. It represents the refusal of the probation force to accept the responsibility of these defective girls and for the resulting failure. It has been the policy of the probation officers, beginning in 1918, to resist, where they could, all orders of probation where the girl had a mental age of X years or less.

As examples of "failure" including "continuance" failures, the probation record of the X-year group is given below. Their failures, although proportionally higher than the other groups, are qualitatively comparable.

Ten became pregnant; eight contracted gonorrhea; four married without consent after sexual irregularities; nineteen were brought in for other sexual delinquency not involving pregnancy, venereal disease, or forced marriage; forty-one or 82 per cent of the probation failures were in terms of sexual offense.

Five were lost on probation; four were unsatisfactory for other reasons. One of these was brought in for stealing; the others proved themselves "unreliable" or "too difficult to supervise," so that every home in which they were placed returned them.

Of the twelve who were not considered failures on probation, none had a mental age below IX years. None below the XI-year group had been sexual offenders; four of the XI-year group had been involved in no sexual irregularities, while four others had had only slight sexual experience. Only one of the group had been involved with more than one person, and this girl certainly is a questionable "success."

TABLE 30.—THOSE GIVEN PROBATION AFTER INSTITUTIONAL COMMITMENT

Mental age	Number given probation	Number of failures	Per cent failing	Number of successes	Average number of months in inst.	Minimum no. of months	Maximum no. of months
VII.....	3	3	100.0	.....	15	8	24
VIII.....	2	2	100.0	.....	15	12	18
IX.....	9	9	100.0	.....	18	8	28
X.....	20	18	90.0	2	15	3	36
XI.....	8	7	87.5	1	15	3	39
Total.....	42	39	92.9	3	15+	3	39

We seem justified in concluding, in spite of the small number of successes (or perhaps because of it), that success occurs most often with those who have not been involved in sexual irregularities; next, with those where sexual irregularities have not been repeated, and where at the same time there have been good standards in the home. The chances for social conformity, where the girl has either been promiscuous or where home standards have been bad, are practically nil on the basis of these cases.

3. SUBSEQUENT COURT ORDERS

There were 92.9 per cent failures on probation after an average institutional stay of fifteen months, as against 91.4 per cent failures when probation was given before an institutional commitment. On the face of these figures, the training received in

TABLE 31.—INSTITUTIONAL COMMITMENTS

Mental Age	Number committed and not committed	Commitments to reformatory			Commitments to State Home for the Feeble-minded						
		Number	Per cent	Number first committed to institution	Difference	Number	Per cent	Chance	Time in months from first offense to admission		
									Average	Minimum	Maximum
III.....	1	.....	.....	.....	.....	1	100.0	1 in 1	6	6	6
V.....	1	.....	.....	.....	.....	1	100.0	1 in 1	2	2	2
VI.....	2	2	100.0	1	1	8	57.1	1 in 1.7	27.5	20	47
VII.....	14	13	92.8	11	2	5	58.4	1 in 2.6	43	36	48
VIII.....	13	12	92.3	10	2	14	36.8	1 in 2.7	28.5	1.5	53
IX.....	38	29	76.3	11	18	13	17.3	1 in 5.7	34.5	12	56
X.....	75	27	36.0	13	14	4	3.9	1 in 25.5	38.5	6	60
XI.....	102	37	36.2	19	18	.....	.....	.....	.....	.....	.....
Total.....	246	120	.....	65	55	46	.....	.....	31	1.5	60
Per cent.....	.....	47.8	.....	26.4	21.4	18.7	.....	Median	32	.....	.....

available institutions seems to have no deterrent effect so far as future delinquency is concerned, but we must consider that those in the group first given institutional care were more serious offenders on the whole than those given probation in the first instance.

Of the entire group, 47.8 per cent were committed to institutions of the reformatory or semi-reformatory type. Of these one hundred and twenty, sixty-five were given the commitment as the first order of the court in their case, while fifty-five were committed after failure on probation, or upon new petitions after the case had been dismissed.

The proportion given institutional care of either type decreases with increasing intelligence. Slightly less than one in five of our entire defective group reached the state home for the feeble-minded. The frequency of commitments decreases quite markedly with increasing intelligence within the defective group.

The average time between the first court appearance and eventual admittance to the state home for the feeble-minded has been thirty-one months, the minimum being six weeks and the maximum being five years.

An analysis of the failures on probation after institutional training is almost exclusively in terms of sexual irregularities. An inspection of the cases making good on probation after institutional training and supervision shows again, as with our first group of probationers tried without previous institutional training, that the few cases of successful probation are limited to the higher mental ages and to those girls who have not been serious sexual offenders.

The major reason for the few commitments to the state home for defectives and for the delay in admission there is due to the very serious housing limitations. Its waiting list for admission varies from about four hundred to eight hundred. The second factor lies in the procedure of commitment, the decision for which lies with a judge who knows nothing of the technical diagnosis of mental defect, and who may utterly disregard the recommendation of those who do. Not only that, but the judge who hears the juvenile court cases and has a familiarity with its problems

does not always make commitments, although he has the legal power to do so. The judge refused to commit some ten per cent for whom an opening had been secured after much effort. In two or three cases, the recommendation of the Lunacy Commission, also, after a very cursory and inadequate examination, was against commitment.

TABLE 32.—DURATION OF 'FOLLOW-UP' AFTER FIRST APPEARANCE IN COURT*

Mental age	III	V	VI	VII	VIII	IX	X	XI	Num- ber	Total years
Duration:										
0 years.....					1	1	7	12	21	0
1 year.....			1		1	1	3	13	19	19
2 years.....					0	4	11	24	39	78
3 years.....	1	1		4	1	5	13	25	50	150
4 years.....				1	4	12	15	12	44	176
5 years.....			1	4	4	8	15	8	40	200
6 years.....				2	0	3	7	5	17	102
7 years.....				3	1	3	0	1	8	56
8 years.....					1	1	4	2	8	64
Total.....	1	1	2	14	13	38	75	102	246	845

* Cases arranged according to mental age.

4. SUMMARY OF 'FOLLOW-UP' FINDINGS

As shown in table 33 only twenty-one of the group were not followed. These represent very largely cases transferred to other states, to other counties, or to other countries.

Four is the median number of years where there was an opportunity for any follow-up work. One hundred and fourteen of the two hundred and twenty-five cases were followed for four or more years.

Of the forty-six committed to the state home for the feeble-minded, thirty-seven remained there; one died, one ran away, and seven were paroled.

Of the thirteen in other institutions, eleven remain there under commitment. Two remain in other institutions in preference to going to the state home, though both girls are over twenty-one.

The most striking fact of the following table is the number who still remain at large in spite of their repeated failures while under the care of the probation officer. We found that as probationers, with or without previous institutional care, over 90 per cent of this group of girls were involved in further delinquency, and yet 69.0 per cent of them are now at large without any agency supervising them.

TABLE 33.—LATEST FOLLOW-UP FINDINGS

Mental age	Number of cases	Number in state home for feeble-minded	Number in other institutions	Not followed	Dead	At large
III.....	1	1				
V.....	1	1				
VI.....	2		1			1
VII.....	14	8	3			3
VIII.....	13	5	2	1	1	4
IX.....	38	10	2	1		25
X.....	75	8	2	7	2	56
XI.....	102	4	3	12	2	81
Total.....	246	37	13	21	5	170
Per cent.....	100.0	15.0	5.0	9.0	2.0	69.0

After final court release, 36.5 per cent were not followed; 16.9 per cent have no adverse reports, and 46.6 per cent are unsatisfactory. Of the one hundred and eight cases definitely followed, 27.7 per cent have no adverse reports, while 72.3 per cent have unsatisfactory records.

The follow-up reports of the cases, which could be checked after the final court order, show that 72.3 per cent of the girls, nine-tenths of whom are no longer under court supervision, still continue to be unsatisfactory in conduct. Sexual offenses are in very high proportion.

Another fact is now evident: marriage in this case is clearly a failure. For the court later gets the children of these girls as dependents through desertion and failure of the parents. The whole situation reminds us of the unsatisfactory home conditions

under which these girls grew up, resulting, as we have seen, in habits of non-conformity on account of their limited intelligence. In the very few years that these girls have been followed, we have definite evidence that the same contributory factors are reappearing to distress the coming generation.

TABLE 34. LATEST RECORDS OF THOSE AT LARGE

Mental age	VI	VII	VIII	IX	X	XI	Total	Per cent
Number of cases	1	3	4	25	56	81	170	
Not reported after petition was finally dismissed	1	1	1	3	7	30	43	25.3
Known to be prostitutes				7	8	13	28	16.5
Known to have had an illegitimate child since the last court order				2	9	7	18	10.6
Involved in other sexual delinquencies			1	5	9	7	22	12.9
Paroled from the state home and promiscuous (sterilized)					2		2	1.2
Married and separated				3	8	13	24	14.1
Married: children deserted				2	5	3	10	5.9
Married and no further information			2	2	6	8	18	10.6
Married, getting along passably				2	2	4	8	4.7
Sterilized and released from state home, married to father of illegitimate child					2		2	1.2
Ran away from state home, married, child a ward of the court for dependency					1		1	.6
Released from the state home, not sterilized, promiscuous					1		1	.6
On parole from state home very short time				1			1	.6
Lost on parole from state home				1			1	.6
Paroled from a reformatory, no adverse reports					2	2	4	2.4
On probation, no adverse reports				1	1	2	4	2.4
On probation, involved in sexual offense					2		2	1.2
At large with relatives, no adverse reports		2			4	6	12	6.2

Of the eight releases and paroles from the Sonoma State Home, two have been too brief to allow any estimate of their success; of the two released without sterilization, both have children who are wards of the court; two others are definite failures on parole, one is lost and the other is promiscuous, her husband who sought her release now urging her return; two are married to the fathers of their illegitimate children and are getting along passably.

IV. CONCLUSIONS

1. THE FACTS AND THE CAUSES

Sexual offense characterizes the delinquency of our defective group, which means that, from the point of view of public health, eugenics, and social standards, the defective delinquent offers a more serious problem than does the average delinquent girl. The group studied was selected on the basis of a single examination. Re-examinations show that the first examination is diagnostic in about nine out of ten cases.

The responses on individual tests show some tests to be relatively much more difficult for our defective group than for a group of intelligent delinquents studied during the same period. These difficult or diagnostic tests require mental alertness and initiative, and failure to pass them indicates a lack of one of these two qualities. There is a wide scattering of the tests passed. Although emotional interference is responsible in some cases, our experience indicates that in this group the irregularity is largely due to unevenly developed abilities.

The interests of these girls in both work and recreation are very meager or of a negative sort; the higher grades showed a wider variety. To how great an extent a lack of native endowment and alertness on the one hand, and unstimulating environment on the other, are responsible for this narrow range of interests cannot be judged. Unquestionably both factors, aggravated by a lack of interests along other lines, operate to create an individual of fewer inhibitions.

On the whole, the girls show emotional activity of a rather primitive type. A lack of ability in complex and varied emotional expression probably lessens the inhibitions, especially where sex is concerned. For this reason, the substitution of desirable emotional activity for that which is socially undesirable is quite impossible.

A study of physical status, while giving evidence of some defective endowment, shows that most of the physical disorders result from a lack of proper attention to personal and social hygiene. Poor physical condition in conjunction with other factors may contribute to insufficient control of conduct. Yet the converse is much more apparent, namely, that irregular conduct is the direct cause of bad physical condition, especially evident in the high percentage of cases with venereal disease.

Marked scholastic retardation occurred. The median age on leaving school was below the compulsory school age. Failure to obtain useful training, with the coincident habit of failure, undoubtedly contributed to delinquency, though to an extent which cannot easily be measured.

Our group is economically very inferior. To what extent this is a factor in delinquency, we have little information. Almost none of the girls who admitted prostitution stated that they began sexual irregularities for the money reward. Prostitution followed earlier delinquencies. Those of the group who have had monetary success in prostitution are those with intelligence enough to earn in legitimate ways at least the minimum wage. Our knowledge of this group leads us to believe that economic inferiority is not a very vital factor in delinquency.

Our study of the nativity of these girls and of their parents shows that the girls born outside of the United States contribute a smaller percentage than we should expect. Those born in this country of foreign-born parents, on the other hand, contribute more than they should. Apparently, "Americanization" of the children more rapidly than of the parents makes for a lack of parental control, which leads to non-conformity outside the home. Of the foreign-born, Spanish and Spanish-American mixtures head

the list. Among those of foreign-born parentage, Italians lead actually, though Spanish-Americans lead in proportion to their number in the San Francisco population. The Germans and English furnish less than their quota.

Home conditions indicate both economic inferiority and a wide divergence from accepted social standards. Occupations of both parents are of the unskilled variety, indicating, on the whole, inferiority of intelligence. There is a very high percentage of broken homes, and of known delinquency in the homes, either on the part of the parents or of the brothers or sisters. Home conditions are strikingly worse than other investigators find when dealing with delinquents not selected on the basis of mental defect. The home conditions of our group leave little doubt in our minds as to why the girls do not conform to accepted social standards, particularly when we remember that defectives are more at the mercy of their environment than are intelligent individuals.

The policy of returning the feeble-minded delinquent to the community under the supervision of a probation officer results in failure. The chances of success are nil if there have been repeated sexual delinquencies. Those who had had only slight sexual experience succeeded only if their homes had not been sordid and if they later continued in decent surroundings with close supervision. Institutional detention, of the reformatory sort available, apparently has no permanent deterrent effect upon those of our group who were immediately committed to an institution. These, of course, were the most serious offenders. The final investigations made when most of the girls were no longer under the control of the court showed that a majority of the girls were failing to live according to accepted standards. We see sexual offenses continuing after marriage and motherhood, and we see desertion of children and failure to provide for them, which indicates that in many cases the unfortunate home environment from which these girls came is being duplicated for their offspring.

2. METHODS OF RELIEF

The data show the inadequacy of present methods with the defective delinquent, either for prevention or correction. The conditions antecedent to the girl's court appearance offered little chance of avoiding non-conformity in social behavior. The public school furnished her no adequate practical training, the home was marked by poverty and vice, and no proper supervision or recreation was made possible for her. Even with a girl of normal intelligence, we feel the chances for conformity would have been slight. These influences were absolute determinants of delinquency with this defective group. We may blame the home; but why, we should ask, were the home conditions so bad? Why did the parents fail to produce the right sort of homes? Evidence points to the fact that in a majority of the cases there was not a marked difference between the intelligence of the parents and that of the offspring. The parents are no more responsible than their inferiorly endowed children who, in some cases, are already becoming inferior parents. What shall be the remedy of this vicious cumulative sequence? We can hope for no immediate and automatic relief. A carefully prepared and carefully executed program may gradually effect improvements. The following points which must be included in such a program suggest themselves from our contact with this group.

a. There should be further studies including correlation of objective tests with the conduct of defectives, both delinquent and non-delinquent. A study of the conditions in the lives of non-delinquent defectives should throw into relief some of the more significant causative factors in delinquency.

b. Cases of mental deficiency and other mental peculiarities should be detected early. This can be done in the school, as all but the low-grade defectives who are not a social danger would thus be reached.

c. A central registration and research bureau should register and follow the defective thus located. Regular visits to the homes

should aid in the control of home conditions. Thus the combination which we found leading inevitably to delinquency namely, defective intelligence plus non-conformity in the home might be recognized before wrong habits of thought and action have been definitely established. Legal pressure could then be brought to bear before actual delinquency had occurred, and custodial care could be urged where necessary.

d. There should be adequate school training of the practical sort within the child's mental reach, which, in the higher grade at least, will lead to remunerative employment. The special school can be effective for the observation of habits which, if unchecked, will lead to delinquency. A definite program should be established for the fostering of wholesome standards.

e. In connection with the central registration bureau and the special schools, there should be a placing agency for the girl who has been trained to do useful work, so that she will have proper placement and supervision; all changes of position should be similarly supervised.

f. More and better supervised recreation should be provided for them. An effort to arouse as many wholesome interests as possible might be effective in counteracting unwholesome interests.

g. Institutional commitment should be planned for those who cannot otherwise have proper guardianship or supervision, and for those who, on the basis of statistical evidence, show that their past habits of thought and action, together with their mental equipment, probably mean failure, unhappiness, and disease to themselves and to those with whom they associate. The probation officer should not be burdened with responsibility for those who have practically no chance to profit by probation.

h. If we are to eliminate the defective delinquent we must make an effort to stop the propagation of those who are most susceptible to the influences which make for delinquency. We have the alternatives of segregation and sterilization. For the promiscuous, segregation is essential. For many high-grade defectives, not promiscuous in their habits, sterilization and

parole seem much more humane and eliminate unnecessary expense. Many of these, if sterilized and protected in a home or even if married, could settle down to a peaceful and happy routine.

i. The public should be educated to realize the special needs of the defective group and the wastefulness of not providing for them.

j. The juvenile court judge should commit on a basis of mental defect without waiting for further serious delinquency. Ideally, the judge should be qualified to appreciate the social, economic, and educational aspects of delinquency and deficiency, and should therefore be appointed rather than elected.

APPENDIX. CASE HISTORIES

CASE I

Lucy S. This girl was first brought before the juvenile court in January 1915, at the age of 13 years, because of truancy. The results of mental examinations and a history of seven years follow:

The parents were Italian immigrants. The mother, who died when Lucy was three years old, was reported by the Italian neighbors to have been 'off. The father is an ignorant fisherman of very inferior intelligence who, after the death of his wife, was totally unable to handle the home situation. The whole family is known to be mentally inferior. One sister, older than Lucy has a mental age of IX years. The children had spent ten years in an orphanage, and a short time previous to this girl's court appearance they had been taken back by the father into his home.

The orphanage, where the girl had lived from the age of 3 to 13, reported her as giving little trouble, but as being wholly unable to do satisfactory school work, or "anything else that requires intelligence." She was doing third grade work at 13 years, when truancy began. The physical examination was negative. The girl had not yet had sexual experiences.

The first mental examination showed her to have a mental age of VIII+ years. She was densely ignorant, not having at her command facts familiar to the average child of eight years. She failed in all tests of judgment. She was found to be very susceptible to suggestion and markedly lacking in persistence. A second examination at 17 years of age showed a mental age of IX years, this being a slight improvement over her previous performance three and a half years before. At 18 years there was no further improvement.

Jan. 1915, she appeared before the court for truancy. She was placed in the home of a married sister who offered to provide for her.

Dec. 1915, the sister brought her to the detention home saying that the girl was absolutely beyond her control. No sexual experience had occurred as yet.

Jan. 1916, she was put in the care of the probation officer who placed her in an approved home where she was to work for her room and board and where she would be given close supervision.

Mar. 1916, she was returned for further court action, as she was beyond the control of her foster mother. By this time sexual irregularity had occurred. She was sent to a training school, remaining there eighteen months. She proved amenable to institutional discipline, but profited little by training. The institution urged that she be given permanent custodial care. The family urged that she be given another trial outside of an institution.

Oct. 1917, she was released from this institution and was put in the care of a probation officer. A home was found for her with an Italian woman

who knew that she was mentally defective, but who was willing to assume the responsibility. The woman soon returned her, saying that she was "impertinent and difficult to control."

May, 1918, another home was found for her, but in a month's time she was again brought back.

July, 1918, she was tried once more in the first home, the woman saying that she felt sorry for the girl and was willing to take her again.

Nov. 1918, she ran away with a 20-year-old Italian boy, who was later found to have a mental age of 8 years. They tried to get married, but did not have a license. They lived together a week or two before being found. They wished to get married and the parents urged it, but the court refused consent.

Dec. 1918, she was sent back to the training school, as there was no room at the state home for the feeble-minded.

Apr. 1920, word was received from the Sonoma State Home that there was an opening. The girl was taken before the Lunacy Commission, which passes on all admissions to state hospitals. They pronounced her "definitely and permanently feeble-minded." This report, with a summarized account of the girl's inability to get along at the various homes in which she had been placed, with probation reports, a report from the training school urging permanent custodial care, a summary of the findings of two psychological examinations, with strong recommendations against the marriage of two feeble-minded persons—all this was presented to the judge sitting that day, who nevertheless dismissed the case. She then went to the home of a cousin. Because of this action of the judge, another petition had to be filed in order that the juvenile court might still have authority over her.

Jan. 1921, she ran away from her cousin's home and went to a home in which she had previously lived.

Nov. 1921, she left the city and could not be found. When found she was married to the feeble-minded boy whom she had tried to marry before. Another effort was made to have her placed in the home for the feeble-minded. The husband's lawyer demanded a jury trial and the jury gave its verdict as "not feeble-minded." She was just 21 years old and was therefore released from jurisdiction of the juvenile court.

There matters now stand. After seven years of court supervision, during which she has clearly demonstrated that she is unable to look after herself, she has finally been released, to assume the responsibilities of a family, with the help of a husband who, on being informed that Lucy was feeble-minded, replied "Well, if she's got the feeble-mindedness she got it here at the detention home, because she was all right when she left me."

CASE II

May M. This case is like many others in which early environment is such that unwholesome habits then formed could not be overcome by later effort.

May first came to the attention of the court as a dependent child when 9 years old, the Society for the Prevention of Cruelty to Children having filed the necessary petition, because of the habitual intemperance of the mother, extreme poverty, and the filthy condition of the home. The father had been injured and was unable to work. Two brothers were very serious delinquents and had been in a reform school. It was found at this time that the family had been dependent upon various charitable organizations for years. Effort was made to improve the home instead of breaking it up. Here May remained, having little recreation and serving as the household drudge. Conditions improved for a time but soon lapsed. May was sent to an orphanage for a year. The mother was then in failing health and had become blind, so the father urged her release and she was returned to her home.

No further complaints were received until some three years later, when she was brought in on a charge of immorality. She was then 16 years old. She was put in the care of a probation officer and placed in a good home. She talked constantly of her sexual experiences to every one around her and repeatedly stole out to meet men and boys. It was soon realized that probation was useless.

Two months after having been put in the care of the probation officer she was committed to a girls' training home. For some time after commitment there, the institution authorities reported her as filthy about her person and her language. She constantly talked about getting out and becoming a prostitute. She remained there a year and ten months, and toward the end of this time had shown quite a marked improvement in her general attitude and behavior. The father, pointing to the fact that she had improved, requested her release to a niece of his who could offer her a good home.

She was accordingly released to go to this home. After three days she wandered off and was found with a group of children telling them of her early sexual experiences. At the end of three weeks the cousin brought her back to the detention home, saying that she was "untruthful and unreliable." The father urged that she be given institutional care and accordingly she was placed in another girls' reformatory until there should be an opening at the state home for the feeble-minded.

After being in this reformatory for some months, word came that she could be received in the state institution for the feeble-minded. The father gave his consent and the girl was taken before the lunacy commission for a recommendation for a commitment. During the court hearing the father changed his mind and urged that they leave her in the reformatory. This was agreed to. The day before she was 21 years old, the girl, having been in the last institution for two years and ten months, was again taken before the commission and this time the judge made the order of commitment which finished the work of the juvenile court.

When the girl had been at the state institution for a year the father sought a parole. He showed that he was now remarried and had a satisfactory home in the country. He felt that, living on a ranch, she would have a protecting environment, and promised to report any tendency to waywardness. As the girl had been sterilized she was granted parole. She remained with the father just four days when she ran off with some men. She was later arrested and returned to the state home. Permanent custodial care seems to be the only satisfactory solution in her case.

CASE III

Dina M. This girl, when 16 years old, ran away from home, became pregnant and was brought to the juvenile court. Investigation showed that the mother had died in Italy during the girl's infancy. Dina had been in this country for six years. The father, a very ignorant Italian, is a gardener when employed. He drinks very heavily, and extreme poverty marks the home, necessitating relief by charitable organizations. A brother-in-law, who lived in the home, had treated her cruelly. She had had little or no supervision.

Examination showed her to have a mental age of 10 years, but inasmuch as she had had little schooling and had been in this country but a relatively short time, this estimate was thought too low. On re-examination some three years later, however, her performance was inferior to the first one. She was very poorly informed and her interests were limited to shows, dances, and housework. She appeared rather self-conscious during the examination, but was docile and tried to do everything which was asked of her.

She was released to be married to one of the men with whom she had been involved, although he was not responsible for her pregnancy. She left him after the baby was born, got a divorce, and lived with another man for two years. She deserted him to live with a soldier by whom she was three months pregnant. When again discovered by the agency which was caring for her first child, the soldier admitted paternity and said he was willing to marry her. The probation officers objected to this plan, and the soldier, at his own suggestion, agreed to support the child. After the second baby was born the girl was sent to the state home for the feeble-minded. She remained there a year when the father of her first illegitimate child urged that she be released to him as he wanted to make a home for her and their child. After sterilization she was accordingly released and was put under the supervision of a social worker, who reports after a year's time that she is getting along passably and is taking fair care of the child, of whom she seems very fond.

CASE IV

Ruth C. came before the court in January, 1918, the mother filing the petition on the grounds that the girl was beyond control. She was then 17½ years old. She admitted that for the past year she had been practicing prostitution.

The father of the girl was a heavy drinker. He also gambled, so that the income of the family was very irregular. Five years previous to this girl's

court appearance he had deserted the family and had thereafter contributed nothing to their support. The parents were American-born. There had always been a lack of supervision in the home. An older sister had had three institutional commitments because of delinquency. She had married and was reported to be getting along satisfactorily.

Ruth left school at 16 when in the low eighth grade. She had worked at various jobs irregularly, and at the time of her court appearance was earning \$10 per week as a telephone operator. Examination showed her to have a mental age of 11 years. Her chief interests were dance halls, cafés, street life and prostitution. She was easy-going and good-natured, but had no ambition and no aversion to prostitution. At the time of this examination permanent detention was recommended.

The girl was released to the married sister, who had previously been a sex delinquent. She continued promiscuity and in three months was returned to the detention home pregnant and infected with gonorrhea. She was given institutional care until the time of the child's birth. She was then released but was later recommitted to the same institution, remaining there until her infection was cured, in all a year and four months.

She was then allowed to go to her mother. She had been out of the institution just ten days when she married a Mexican whom she met in a café where he was a waiter. They lived together a month when he left her because "she was running around with other men." She was again found to be pregnant and venereally infected. She was referred to the board of health to insure proper medical attention, and remained in her mother's home. The husband made no effort to contribute to his child's support and disappeared. The petition was dismissed as the girl was 21 years old.

CASE V

Anita P. This girl, when 15 years old, was brought before the juvenile court on the petition of her father because she had run away from home and had become delinquent. She was placed on probation but disappeared shortly after. When she was found a year later she was infected with both gonorrhea and syphilis.

She was found to have a mental age of 10 years, and institutional care was urged both because of her physical condition, and because of the fact that she was so irresponsible that continued delinquency seemed inevitable. Accordingly she was sent to an institution, but after a few months, because of the critical illness of her mother, she was given a temporary release to help in the home. Upon the death of the mother both the girl and the father urged her release so strongly that she was allowed to continue in her father's home, he promising that he would look after her very closely. This he did for a time, and things went along fairly well. He then remarried, and soon lost his interest in this girl, who until the time of his remarriage had been doing his housework. Soon after, she married a worthless and erratic boy. He was drafted and sent to an army camp, and in his absence his mother reported

that the girl was promiscuous. He was shortly discharged because of inferior physical condition. They lived together again, but he worked little or not at all, and constantly drew on his family for support. Conditions got so bad that the boy's mother had him committed to one of the state hospitals for the insane, to be cured of his alcoholism. After his commitment, the girl was found wandering on the streets, dirty, penniless, and four months pregnant. After his release they again lived together, his family helping them to get established. They were arrested shortly after for neglect of their child. Some two years after the girl's release from the jurisdiction of the probation officer, the Society for the Prevention of Cruelty to Children filed a petition with the court in behalf of her two children, as the parents were moving from one cheap boarding house to another and were giving the children no care. The father was again reported to be drinking heavily and working little, and none of the unfortunate little family had enough to eat. The children were made wards of the court and the parents have since disappeared.

•

UNIVERSITY OF CALIFORNIA PUBLICATIONS
IN
PSYCHOLOGY

Vol. 3, No. 5, pp. 215-223

June 2, 1928

THE JUDGMENT OF PITCH AS A
FUNCTION OF THE SERIES

BY

STANLEY R. TRUMAN AND E. G. WEVER

UNIVERSITY OF CALIFORNIA PRESS
BERKELEY, CALIFORNIA

UNIVERSITY OF CALIFORNIA PUBLICATIONS

Note.—The University of California Publications are offered in exchange for the publications of learned societies and institutions, universities and libraries. Complete lists of the publications of the University will be sent upon request. For sample copies of publications or other information address the **MANAGER OF THE UNIVERSITY PRESS, BERKELEY, CALIFORNIA, U. S. A.** All matter sent in exchange should be addressed to **EXCHANGE DEPARTMENT, UNIVERSITY OF CALIFORNIA LIBRARY, BERKELEY, CALIFORNIA, U. S. A.**

Publications of the University of California Press may also be obtained from **THE CAMBRIDGE UNIVERSITY PRESS, PETTER LANE, LONDON, E. C. 4, ENGLAND** which orders originating in Great Britain and Ireland should be sent.

PSYCHOLOGY.—George M. Stratton, Warner Brown, and Edward C. Tolman, Editors.
Price per volume, \$3.50. Cited as Univ. Calif. Publ. Psychol.

- Vol. 1.**
1. The Judgment of Differences, with Special Reference to the Doctrine of the Threshold, in the Case of Lifted Weights, by Warner Brown. Pp. 1-71, 4 text figures. September, 1910..... \$
 2. The Process of Abstraction, an Experimental Study, by Thomas Verner Moore. Pp. 73-197, 6 text figures. November, 1910.....
 3. The Judgment of Very Weak Sensory Stimuli, with Special Reference to the Absolute Threshold of Sensation for Common Salt, by Warner Brown. Pp. 199-268, plates 1-4. February, 1914.....
 4. Habit Interference in Sorting Cards, by Warner Brown. Pp. 269-321. April, 1914.....
 5. Diurnal Variations in Memory and Association, by Arthur I. Gates. Pp. 323-341. March, 1916.....
 6. Correlations and Max Differences in Memory and Substitution, by Arthur I. Gates. Pp. 345-360. May, 1916.....
- Vol. 2.**
1. Variations in Efficiency during the Day, together with Practice Effects, Sex Differences, and Correlations, by Arthur I. Gates. Pp. 1-156. March, 1916.....
 2. Experiments on Attention and Memory, with Special Reference to the Psychology of Advertising, by J. M. Levy. Pp. 167-197. March, 1916.....
 3. The Psychology and Physiology of Mirror Writing, by Justin K. Fuller. Pp. 199-265. May, 1916.....
 4. Memory and Association in the Case of Mirror-Card Advertising Cards, by Walter H. Heller and Warner Brown. Pp. 267-276. May, 1916.....
 5. A Comparison of the Japanese Folk Song and the Occidental: A Study in the Psychology of Form, by Mangoro Ito. Pp. 277-290. May, 1916.....
 6. Individual and Sex Differences in Suggestibility, by Warner Brown. Pp. 291-330. July, 1916.....
- Vol. 3.**
1. An Experimental Study of Abnormal Children, with Special Reference to the Problems of Dependency and Delinquency, by Olga Bridgman. Pp. 1-60. March, 1918.....
 2. Analysis of Package Labels, by Walter H. Heller. Pp. 61-72, plates 1-3. January, 1919.....
 3. A Study of the Major Emotions in Persons of Defective Intelligence, by Henshaw May Morrison. Pp. 73-115. December, 1924.....
 4. Factors Contributing to the Delinquency of Defective Girls, by Joan Walker. Pp. 117-213. April, 1926.....
 5. The Judgment of Pitch as a Function of the Harmonic, by Stanley R. Truman and E. O. Weyer. Pp. 215-223. June, 1928.....

PHILOSOPHY. George P. Adams, J. Loewenberg, and E. C. Pepper, Editors.
Cited as Univ. Calif. Publ. Philos.

The first volume of the University of California Publications in Philosophy appeared November, 1901, and was prepared in commemoration of the seventieth birthday of former George Holmes Howison, under the direction of a committee of his pupils composed of Evander Bradley McCollivay, Charles Henry Nieber, Harry Allen Overstreet and Cha Montague Bakewell. The price of the volume is \$2. It may be had bound, or the parts may be obtained separately. Its contents are:

- Vol. I.**
1. The Summum Bonum, by Evander Bradley McCollivay. Pp. 1-27.....
 2. The Essentials of Human Faculty, by Sidney Edward Mezes. Pp. 28-55.....
 3. Some Scientific Apologies for Evil, by George Malcolm Stratton. Pp. 56-71.....
 4. Pragmatism and the a priori, by Charles Henry Nieber. Pp. 72-91.....
 5. Latter-day Flowing Philosophy, by Charles Montague Bakewell. Pp. 92-114.....

UNIVERSITY OF CALIFORNIA PUBLICATIONS
IN
PSYCHOLOGY

Vol. 3, No. 5, pp. 215-223

June 2, 1928

THE JUDGMENT OF PITCH AS A FUNCTION
OF THE SERIES

BY

STANLEY R. TRUMAN AND E. G. WEVER

In the measurement of sensitivity by the Method of Constant Stimuli, it has frequently been shown that a judgment is not simply and invariably a comparison of one magnitude with a standard magnitude, but it may, under some circumstances at least, involve what have been called absolute factors. A given weight may be judged "heavier" by virtue of an absolute impression of heaviness, and not because it is perceived to be heavier than the standard weight that preceded it.¹ The standard, presumably, could have been omitted. Indeed, as work in esthetics, affection, and other fields has shown, a method of absolute judgment may be employed in which there is no standard stimulus, but selected stimuli are presented one by one, and the *O* reports by absolute impression upon each of them. By such a procedure color stimuli may be judged as to their pleasantness, a set of photographs may be ranked as to their esthetic value, etc.²

The Method of Absolute Judgment seems to have arisen quite unobtrusively and without any burden of formulated theory

¹ See Martin, L. J., and Müller, G. E., *Zur Analyse der Unterschiedsempfindlichkeit* (Leipzig, 1899), pp. 43 ff.

² Jonas Cohn describes a later form of the method in his article, "Gefühlston und Sättigung der Farben," *Phil. Stud.*, vol. 15 (1900), pp. 281 ff.

upon it. Yet it is apparent that any given judgment is "absolute" only in the sense of being referred to no particular standard stimulus; it is "relative" to some broad and general basis established in previous experience. The experience may be very general and undefined, as when one considers the artistic value of a painting, or it may be mainly restricted to a presented series of stimuli, as is true for a set of colors that are given to be ranked in order of pleasantness.

In the case in which the basis for judgment may be considered as essentially a function of a particular series of stimuli, one can study it in its course of development and determine how readily it may be established and become effective for judgment. Such a study is the object of the present experiment; judgments of auditory pitch are considered as a function of a presented series, and the attempt is made to determine how soon one can set up an absolute basis for judgment.

Now perhaps the most direct way of attacking a problem such as this would be to select a set of stimuli, in this instance pitch values, and to present at random the various members to the *O* until he became sufficiently familiar with the total range to judge them individually in any desired terms, say "high" and "low"; and the number of presentations necessary to establish a familiarity sufficient for report might be a measure of the readiness with which the judgmental level had been established. But here is a difficulty, for, since one must trust the *O* to decide when he is to begin judging, the situation involves not only the establishment of a judgmental level, but also of a certain uncontrollable degree of faith of the *O* that the level is adequate.

To avoid this difficulty one can resort to a stratagem: the *O* is given a standard and is instructed to hold this standard in memory and to render comparative judgments on each of the single stimuli which follow; but the experiment is extended beyond any capacity of memory under the conditions, and hence the *O* ultimately is forced to an absolute basis for his report. The problem remains merely to diagnose when relative judgment has decayed and absolute judgment has set in. Here two

ways are open: (1) One might presume that the variability of the judgments would be different for absolute and for relative; or (2) one might choose the standard so that the distribution of judgments on a relative basis would not correspond with the distribution on an absolute basis. In the present experiment both methods have been followed, as will soon be clear.

A. *First procedure*.—With a Stern *Tonvariator* a standard tone of 520 d.v. per sec. was sounded, and then, by the Method of Constant Stimuli, the *O* was asked to judge each of five comparison tones, say, 516, 518, 520, 522, and 524 d.v. per sec., presented singly in haphazard order. The standard was given twice for two seconds each, at the beginning, and was not again sounded, as standard, until 50 judgments (i.e., 10 series, each with 5 stimuli) had been rendered. These 50 judgments constitute a group called an “A group”).

B. *Second procedure*.—After every even-numbered group of the first procedure a new group was interpolated in which the procedure was exactly the same except that the stimuli of the series were no longer symmetrical about the standard, but were displaced toward the “higher” side; whereas, e.g., a “normal” series (series A) was made up of tones 516, 518, 520, 522 and 524 d.v. per sec., with 520 as the standard, the new series (series B) was made up of tones 520, 522, 524, 526, and 528, with 520 still as the standard.³

Now, presumably, in the first procedure the *O* at the beginning would make relative judgments, but with the fading of memory for the standard he would be reduced to an absolute basis for his report. And it seemed reasonable to assume that the absolute basis would give a distribution of judgments which approached more closely the order of chance, and hence an examination of the fractionated data of the groups should disclose a decrease in the precision of the psychometric functions as a consequence of the change from relative to absolute. In the

³ *O* was of course kept in entire ignorance of these series, and not once did he show evidence of suspecting a change in the stimuli used.

second procedure it is plain that if the judgments are a function of the series their distribution must be markedly different in the displaced series from what it was in the normal series, and if they are at first relative and then absolute they should show a redistribution coincident with the change.

Observers.—The *O*s were Miss Marjorie Mallon (*M*), Miss Neva Mallon (*N*) and Miss Margaret Dill (*D*). They were quite

TABLE I
OBSERVER *M*

	<i>A</i> , normal series						<i>B</i> , displaced series					
	First fraction		Second fraction		Total		First fraction		Second fraction		Total	
	H	L	H	L	H	L	H	L	H	L	H	L
516	00	16 84	00	30 70	00	24 76						
518	00	60 40	04	46 50	04	50 46						
520	16	60 24	18	50 32	20	56 24	00	60 40	04	40 56	02	50 48
522	64	32 04	44	46 10	52	42 06	12	52 36	08	56 36	10	54 36
524	72	28 00	72	28 00	77	23 00	36	40 24	48	44 08	42	42 16
526							80	20 00	68	24 08	74	22 04
528							100	00 00	84	16 00	92	08 00
1	2	3	4	5	6	7						

naïve as to psychophysical procedure. Two, *M* and *N*, had enjoyed considerable musical training, and one particularly, *N*, showed unusually good absolute-pitch discrimination when tested on an instrument (piano) with which she was familiar.

Results.—There were five sittings for each *O*, each sitting involving two groups (*A*) of the normal series and a third group (*B*) of the displaced series, making in all 100 series of *A* and 50 series of *B*. A rest period of five minutes occurred between successive groups. The groups for each procedure have been fractionated into halves. The first fraction of *A* includes the first 5 series of every odd-numbered *A* group, i.e., the first 5 series of each sitting, while the second fraction includes the last 5 series of every *A* group. The first fraction of *B* includes the

TABLE 2
OBSERVER N

	A, normal series						B, displaced series					
	First fraction		Second fraction		Total		First fraction		Second fraction		Total	
	H	L	H	L	H	L	H	L	H	L	H	L
516	04	00	96	00	12	88	01	09	90			
518	00	16	84	00	28	72	00	24	76			
520	00	56	44	16	42	42	09	46	45	00	12	88
522	28	56	16	28	62	10	08	24	68	08	36	56
524	56	36	08	54	40	06	20	64	16	24	48	28
526							52	40	08	36	56	08
528							84	12	04	76	24	00
1	2		3		4		5		6		7	

TABLE 3
OBSERVER D

	A, normal series						B, displaced series					
	First fraction		Second fraction		Total		First fraction		Second fraction		Total	
	H	L	H	L	H	L	H	L	H	L	H	L
500	00	08	92	06	04	90						
510	12	16	72	22	18	60						
520	28	24	48	42	24	34	16	12	72	08	16	74
530	44	40	16	66	26	08	36	24	40	24	28	48
540	96	04	00	88	10	02	40	40	20	48	28	24
550							68	16	16	80	16	04
560							100	00	00	96	04	00
1	2		3		4		5		6		7	

first 5 series of every *B* group, and the second fraction, the last 5. In tables 1-3 are shown, for each *O*, the percentages of judgments of "higher," "equal," and "lower" for every fraction and for the total series of the two groups. The arrangement of the three tables is similar. The columnar divisions are

numbered at the foot of the table from 1 to 7. The first division shows the stimulus values used. The second division shows the percentages of judgments in the three classes ("H" higher, "=" equal, "L" lower), rendered for the first fraction of the normal groups, the third division shows these percentages for

TABLE 4

O	Values of:	Series A			Series B		
		First fraction	Second fraction	Total	First fraction	Second fraction	Total
M	C _H	521.97	522.44	522.05	524.48	524.83	524.63
	PE _C	.44	.31	.21	.33	.47	.27
	h _H	0.270	0.271	0.290	0.360	0.256	0.314
	C _L	517.96	517.49	517.98	518.07	520.49	520.16
	PE _C	.40	.72	.30	1.52	.58	.45
	h _L	0.300	0.117	0.202	0.079	0.206	0.189
N	C _H	523.80	523.79	523.38	525.78	526.36	526.05
	PE _C	.71	.43	.23	.41	.50	.32
	h _H	0.169	0.197	0.259	0.291	0.238	0.263
	C _L	520.00	519.33	519.54	522.70	522.57	522.57
	PE _C	.40	.25	.21	.41	.40	.27
	h _L	0.297	0.333	0.279	0.291	0.298	0.309
D	C _H	527.44	522.87	524.52	541.38	539.28	539.82
	PE _C	2.15	1.83	1.12	3.81	2.18	1.70
	h _H	0.056	0.046	0.053	0.031	0.055	0.050
	C _L	518.13	514.22	515.34	527.88	529.50	528.27
	PE _C	2.17	1.43	1.08	3.13	2.20	1.87
	h _L	0.055	0.059	0.055	0.038	0.054	0.045

the second fraction, and the fourth division shows the percentages for all the *A* series taken together. Similarly, division 5 gives the percentages for the first fraction of the *B* groups, division 6 for the second fraction, and division 7 for the whole of the *B* series.

To facilitate the further consideration of the results they have been subjected to statistical treatment. Ogive curves have been fitted, by Urban's method,⁴ to the distributions of "higher"

and "lower" judgments in each division of tables 1-3. For every *O*, the values of *C*, the 50 per cent crossing-points of the fitted curves, of *PE_c*, the probable error of *C*, and of *h*, the measure of precision of the curves, have been computed for both "higher" and "lower" distributions, and are shown in table 4. The first column of this table gives the initial of the *O*. The

TABLE 5
MEASURES OF GOODNESS OF FIT*

<i>O</i>	Totals, series:	"higher"	"lower"
<i>M</i>	A	.98	.93
	B	.98	.84
<i>N</i>	A	.54	.72
	B	.89	.96
<i>D</i>	A	.77	.74
	B	.41	.81

* See note 6.

second column designates the three above-mentioned values, which bear subscripts (_H or _L) to indicate whether the distribution is of the "higher" or "lower" judgments. The probable error of each *C* will be found immediately below it.⁵ The last six columns of the table correspond to the six divisions of the data as given in tables 1-3.⁶

⁴ For the method, see E. G. Boring, "Urban's tables, and the Method of Constant Stimuli," *Am. Jour. Psychol.*, vol. 28 (1917), pp. 280-293.

⁵ *C* is what is called the limen, *L*, in the Constant process as used for the determination of absolute thresholds; see note 4, *supra*. The *PE* of *C* has been determined by the usual formula for the median of a normal distribution, using the number of series as *n*. See Culler, E., "Studies in Psychometric Theory," *Psychol. Monog.*, vol. 35 (1926), pp. 85 ff. A value obtained by this method is weighted with assumptions, and must be used with a certain reserve. But as a rough measure it is good enough.

⁶ The use of Urban's method is justified, of course, only when the data are distributed "normally," or very nearly so. The goodness of fit of the ogives to the observations has been determined for both the "higher" and "lower" curves for the total series of *A* and *B*, and the determinations are given in table 5; the method of determining goodness of fit follows Thomson (Brown, W., and Thomson, G., *Essentials of Mental Measurement* (1925), pp. 78-81), who has adapted Pearson's method to the Constant process. The values of *P* as here determined are unusually high, indicating good approximation to "normality." The distributions for the fractions of *A* and *B* diverged, in general, more widely.

Discussion.—One must first justify the method that has been adopted in this experiment by proving that the conditions do not permit the retention of the standard and, hence, relative judgment throughout the group. Such proof is evident in tables 1-3 in the distributions of the judgments in the *B* groups. The distributions are not decidedly skewed to one side of the standard (i.e., they are not predominantly judgments of "higher") as they ought to be if they were relative judgments; they tend, instead, to be symmetrical about the midpoints of their own series, which should be the case if they were purely or predominantly absolute.⁷ The differences between the distributions of *A* and *B* form a measure of the predominance of the absolute factor; these differences can be expressed most conveniently as differences between the crossing-points of the fitted curves, as shown in table 4, columns 5 and 8. In every case the values of *C* in *B* show a shift toward the "higher" side; the shifts are highly significant in every instance, being from 4 to 9 times their probable errors. This is sufficient proof that the absolute factor has asserted itself in the determination of the judgments.

If in the *A* groups the judgments are first relative and then become absolute, one would not expect any significant change in the values of *C* in the first fraction and in the second; this is the case; but one might expect under the conditions, as has been stated above, a change in the values of *h*. But there is no such change of any significance (compare columns 3 and 4 in table 4); out of the six cases shown, *h* increases as often as it decreases; and, as has been found mathematically, in but one instance is the difference over twice its probable error. And what is perhaps of even greater import, there are no significant differences in the *h* values between the two fractions of *B*, where a change from relative to absolute, involving, obviously, a redistribution of the judgments, would be expected to cause a marked reduction in the precision of the curves. Nor are there in the *C* values any

⁷ In regard to the tendency for judgments to distribute themselves symmetrically about the midpoint of a series, cf. the findings of H. L. Hollingworth on the estimation of magnitudes ("The Inaccuracy of Movement," *Arch. Psychol.*, vol. 2 (1909), pp. 21-39; "The Central Tendency of Judgment," *Jour. Phil.*, vol. 7 (1910), pp. 461-469).

significant differences between the two fractions of *B*, where a change in the basis of judgment would most likely be reflected.

That none of these changes is revealed is taken to signify that almost from the beginning of each group the judgments have been rendered predominantly or wholly on an absolute basis. The results show that the absolute basis for judgment is established with striking readiness and effectiveness; it appears early enough completely to obscure, within the limits of these observations, any effect of holding over the standard for relative judgment.

The influence of the relative factor in the earliest series has not been revealed in the above results, but this fact does not, of course, signify that it was never present in the judgmental situation; the first judgment most assuredly was a relative one, and it is probable that the relative factor was of considerable importance in the whole first series (of five judgments). With so few groups a further fractionation, as into single series, gives results of little reliability, but such a treatment of the data of the *B* series indicates a shift in the distribution of judgments between the first and the second or third series, but no particular change after that. Here, of course, the absolute factor was working against the relative (if the relative was present), and perhaps also against the absolute basis that had been set up by the presentation just previously⁸ of twenty series in the *A* arrangement. That under these conditions a few presentations sufficed to establish a new judgmental level with such firmness that, for the number of groups considered, the first five series is indistinguishable in the mass from the next five, suggests a remarkable facility for change in the absolute basis for judgment.

Summary.—Judgments of pitch may be made on an absolute basis, a basis which has become established by the presentation in haphazard order of the members of a series of pitch stimuli. The establishment of such a judgmental basis is a very rapid process, being probably complete after but two or three series of five stimuli each.

⁸ It will be recalled that an interval of five minutes separated the two groups.

UNIVERSITY OF CALIFORNIA PUBLICATIONS
IN
PSYCHOLOGY

Vol. 3, No. 6, pp. 225-243, 3 figures in text

August 18, 1928

PSYCHOLOGICAL STUDIES OF
MOTION PICTURES

II. OBSERVATION AND RECALL AS A
FUNCTION OF AGE

BY

HAROLD ELLIS JONES

ASSISTED BY

HERBERT CONRAD AND AARON HORN

UNIVERSITY OF CALIFORNIA PRESS
BERKELEY, CALIFORNIA



UNIVERSITY OF CALIFORNIA PUBLICATIONS
IN
PSYCHOLOGY

Vol. 3, No. 6, pp. 225-243, 3 figures in text

August 18, 1928

PSYCHOLOGICAL STUDIES OF MOTION
PICTURES

II. OBSERVATION AND RECALL AS A FUNCTION
OF AGE*

BY

HAROLD ELLIS JONES

ASSISTED BY HERBERT CONRAD AND AARON HORN

Motion pictures offer the psychologist a well controlled technique for laboratory experiments. Problems in attention, perception, and memory can be studied in the projection room under more standard stimulus conditions than are possible with the ordinary group oral or visual methods. Repetitions are exact, or are capable of being varied with complete control of speed and exposure intervals; the film, furthermore, preserves its own record of the experiment, which can later be reviewed and transcribed as desired. In range of content, this medium provides a wide choice, from verbal material to pictured episodes which may carry the emotional tone and sensory fullness of a lived experience. Perhaps of chief importance, particularly in experimental work with adults, is the factor of motivation; even in quite diverse groups it is possible, with "movies," to create a satisfactory level of effort through incentives which are intrinsic to the situation. In view of these and other advantages, it is surprising that so little use has been made of the motion picture in the psychological laboratory, and, as a subsequent development, that so little use has been made of psychologists in applied studies of motion picture production and exhibition.

*The first study, "Attendance at Moving Pictures as Related to Intelligence and Scholarship", appeared in *Parent-Teacher*, 4 (1928): 18-21.

The present report deals with results obtained in a series of tests of observation and recall based upon motion-picture narratives.

The collection of these data was supported by a grant from the research funds of Columbia University. Acknowledgments are due to Professor R. S. Woodworth, of Columbia University, and to the Yale University Press.

The films employed were:

A. A picture from the Yale Historical Series (*Vincennes*, modified to two reels).

B. A romantic drama featuring Charles Ray and John Gilbert, and dealing with "character" narrative (*The Busher*, modified to 4 reels).

C. A western picture, featuring Hoot Gibson, and consisting almost entirely of the prevailing cowboy rituals of "action" (*The Loaded Door*, 5 reels).

On the subject-matter of each picture, tests were made consisting of from 40 to 48 completion and multiple choice items; the questions dealt with verbal as well as with pictorial material, and with incidental episodes and atmosphere as well as with direct continuity. Each reel was systematically covered, the final test being edited by a group of psychologists who had studied the film in experimental previews.

It was desired that individual differences in test scores should depend basically upon differences in the observation, understanding, and recall of the picture. This aim was sought by making the questions of a nearly zero range of difficulty in vocabulary and phrasing. Each question was brief, direct, and simply worded.¹ Within the educational limits of our group, variable

¹ The following are representative questions:

In what State was Harrodsburg?

How many British were at the meeting?

At the end of the picture, British soldiers were shown marching out of

The British general warned the Indians not to

The British and Indians sat in a circle and (a) signed a paper, (b) sharpened their axes, (c) smoked a pipe, (d) looked at a map.

From Kaskaskia to Vincennes, how far did Clark have to march?
(a) 500 miles, (b) 240 miles, (c) a day's journey, (d) nobody had measured it.

test performance may be considered as chiefly a function of "picture comprehension and memory," and not of "paper and pencil ability." (Of the adults taking the tests 98 per cent had completed grade 4, and 85 per cent had completed grade 8.) Time limits were assigned for each test: *A*, 11 minutes; *B*, 14 minutes; *C*, 14 minutes. The effects of these time limits will be considered later.

METHOD OF ADMINISTRATION

The tests were given in eight villages in Vermont, selected, by a number of criteria, as a representative sample of rural communities in that State. Arrangements were made with the local motion picture exhibitor to advertise and present our films under conditions similar to those of the regular weekly commercial showing. Printed placards announced that admission was free, and that in return for the entertainment the spectators would be requested to answer "a brief and interesting questionnaire." It was not stated that the questionnaire would in part be related to the moving picture; this portion of its content may therefore be considered as an unannounced test of observation, or fidelity of report. Our small halls were, as a rule, packed to the last seat by an amiably curious throng of farmers and villagers; in these thrifty New England communities, a free show proved a dependable means of gaining popular interest and support. At the end of each picture, a brief talk served to state as much as was necessary of our purposes; at the same time pencils, lapboards, and printed test booklets were quickly circulated through the hall by a group of monitors.² The first page of each booklet contained

² In an intelligence test survey, covering the same towns in Vermont, as well as a group of others in Massachusetts and New Hampshire, the same methods of sampling and test administration were employed. A report of this parallel investigation (Jones, H. E., "A First Study of Parent-Child Resemblance in Intelligence," *Twenty-seventh Yearbook of the National Society for the Study of Education*, pt. 1, chap. 5) gives evidence indicating (1) that the towns selected were a fair sample of rural communities in northern New England, and (2) that the persons tested were an adequate sample from these towns. Of 277 adult males, 4.6 per cent were in a professional group; 4.6 per cent were technicians; 10.8 per cent small business executives; 10.8 per cent skilled laborers; 41.5 per cent farmers; 15.1 per cent

questions on moving picture interests and preferences, and was designed to keep the audience occupied until all the blanks had been given out. They now turned to page two, received final instructions, and began the test. In order to prevent copying, each test was printed in two forms, containing the same questions in different sequences; persons in adjoining seats received alternate forms. The general situation was organized in such a way as to produce a good-humored social pressure toward coöperation; under the age of 40, adequate effort was obtained from over 95 per cent. Above the age of 40, a small, increasing number pleaded exemption, usually because of difficulty in reading, although exceptionally large and clear type was used in the tests (monotype 12 pt. solid). This excuse, whether bona fide or not, doubtless operated to give a very slightly superior selection of cases in the upper age ranges, particularly in the fifth decade. For if true, it would indicate a failure to own glasses for reading, and this indifference would occur more frequently with the socially and intellectually inferior. (Of course in some cases glasses were owned but not habitually carried.) Where the excuse is merely an evasion of an undesired task, this also tends to be associated with ineptness for the task. While an occasional octogenarian filled in our blanks and made a reputable score, it was evident that individuals above 60 or 65, even with corrected vision, were not usually equal to taking a test, and no systematic attempt was made to collect records beyond the age of 60.

For the majority of the age groups, a similar study in urban communities would not be expected to yield as satisfactory a degree of coöperation. In the census of these Vermont districts, illiteracy amounts to less than 1 per cent; language handicap, due to rearing in a bilingual or alien home, is similarly rare, since the population is almost entirely native born of native parents. About 87 per cent of the total group are primarily of old New

semi-skilled laborers, and 12.1 unskilled laborers. This is so close to the occupational distribution of Vermont, that a system of deliberate selection could hardly have yielded a better sample. With reference to later conclusions in this article, it is important to note that, for those living in these communities, the selection was clearly as good at the upper as at the lower age levels.

England stock, and about 12 per cent of French-Canadian origin, dating back two or more generations in Vermont. The average army Alpha score of adults in these communities ranges from 94 at the age of 20 to 72 at the age of 50.

TABLE 1
AGE MEDIANS FOR PERFORMANCE IN MOVING PICTURE TESTS*

Age group	Test A			Test B			Test C ₁			Test C _{1d}		
	N	Md	Q	N	Md	Q	N	Md	Q	N	Md	Q
11-11.9	9	20.5	12.2	13	22.8	4.7				7		
12-12.9	19	38.5	9.9	15	28.5	10.2	8	28.5	6.5	13	27.5	9.5
13-13.9	30	48.5	13.1	18	38.8	6.6	11	24.2	6.2	22	25.0	7.1
14-14.9	24	46.0	13.7	18	42.0	10.2	11	32	11.9	18	31.5	8.6
15-15.9	16	51.8	13.2	10	53.0	17.5	12	33.5	2.0	16	33.5	3.4
16-16.9	19	46.5	11.2	15	42.8	12.7	13	30.2	4.8	18	30.5	5.5
17-17.9	15	52.5	11.2	13	59.5	16.3	7	32.5	5.2	10	32.0	6.4
18-18.9	15	48.5	9.7	7	48.5	19.7	14	36.5	1.7	21	34.5	4.0
19-21.9	28	60.8	13.2	17	56.5	15.6	19	35.5	3.4	23	34.5	4.0
22-24.9	8	35.5	16.0	5	67.5	15.7	7	35.5	3.2	8	36.0	3.1
25-29.9	24	58.5	15.0	13	61.8	5.2	12	35.0	3.2	16	33.0	3.9
30-34.9	18	41.8	16.0	14	41.0	12.5	7	38.5	2.5	14	33.5	6.6
35-39.9	20	52.5	11.5	9	47.5	13.1	11	33.5	6.0	15	33.5	6.0
40-44.9	19	55.5	13.7	8	53.5	14.0	12	35.5	2.0	17	34.5	4.5
45-49.9	13	37.5	9.3	11	40.5	16.2	8	34.5	5.2	15	33.5	4.5
50-54.9	10	40.0	17.0	15	42.5	16.7	3			10	25.0	6.0
55-59.9	7	9.5	24.9	9	28.5	8.8	3			4		

* Owing to the small number of cases in each age group, medians were computed by the midscore method $\frac{n+1}{2}$ rather than by interpolation in a frequency distribution.

In Test A the maximum possible score was 96, in Test B, 80, and in the original Test C, 80, each test item being scored 0, 1, or 2, according to specified standards in a scoring key. In the conventional terms of "coefficients of report" of a testimony experiment, the test scores may be interpreted as $n(D)$, absolute range of report in the deposition. The relative range of report may be obtained from $\frac{n(D)}{P}$, where P represents the total

number of items in the test. See Stern, L. W., *Beiträge zur Psychologie der Aussage*; and Whipple, G. M., "The Observer as Reporter: a Survey of the 'Psychology of Testimony'," *Psych. Bull.*, vol. 6 (1900), pp. 153-170.

Test C as a total showed a relatively small age discrimination, due to a limited range of difficulty in the test items. This defect was evidenced by a low variability, and by the accumulation of scores near the upper score limit; this was particularly the case with the 20 multiple choice items, which (in the various age groups) gave a pronounced negative skew and

TREATMENT OF RESULTS

An inspection of the medians in table 1 reveals a tendency of the scores to increase up to the age of 18, or even higher, with a fairly marked decline beyond middle age. The reader will desire to compare the medians in the various tests, in order to judge of the consistency of the findings. This is not possible, however, in the case of raw scores, because of inequalities in test difficulty and in the total number of test items. The data of table 1 show a further defect in that the cases taking a single test are too few to justify computing the reliability of the difference between ages. In order to make possible a combination of the several distributions, sigma score equivalents of the raw scores were determined by McCall's *T* method,³ for all members

an average coefficient of variability about one-half as high as in the other tests. As a consequence, these items have been eliminated, restricting Test *C* to the remaining 20 completion items and to a maximum score of 40.

With two audiences, Test *C* was administered (unannounced) one week after the picture had been seen, instead of immediately at the conclusion of the picture. The delay scores were surprisingly good, averaging, with equivalent groups, 82 per cent as high as the immediate scores, and showing closely similar medians at each age. As the proportion of delay scores was approximately constant in the various age groups, it appeared justifiable, for the present purposes, to combine the 92 delay cases with the 158 cases in the immediate test (C_{i+d}).

The following reliabilities have been computed:

	Age	Reliability coefficient
Test <i>A</i>	10-16.9	.92
	17-54.9	.95
Test <i>B</i>	10-16.9	.91
	17-54.9	.92
Test C_i	10-54.9	.89
Test C_d	10-54.9	.93

³ McCall, W. A., *How to Measure in Education*, pp. 272-281. The following is a sample of the calculations on test *C*.

Raw score	Number of cases receiving that score	Number of cases exceeding that score	Per cent exceeding one-half of those reaching	Scale score
33	12	80	54.8	48.8
34	12	68	47.1	50.7
35	11	57	39.8	52.6

A scale score of 50 is, of course, at the median for the adult group. A scale unit above or below 50 represents 1/10 of a standard deviation above or below the average of this group when normally distributed. The writers

of the age group 16 to 19.9 in each test. Setting the age limits at these points enables us to work with a standard distribution in which the scores show a minimum correlation with age. After the requisite computations, the medians of table 1 were converted into (comparable) medians in terms of scale scores.

TABLE 2
SCALE SCORE
EQUIVALENTS FOR THE AGE MEDIANS OF TABLE 1

Age group	Test A		Test B		Test C ₁		Test C _{11d}	
	N	Median	N	Median	N	Median	N	Median
11 to 11.9	9	35.8	13	33.8	0		7	.....
12 to 12.9	19	44.3	15	37.5	8	43.5	13	42.5
13 to 13.9	30	49.8	18	43.5	11	40.2	22	40.9
14 to 14.9	24	48.3	18	46.0	11	46.7	18	46.5
15 to 15.9	16	50.6	10	51.0	12	49.0	16	48.8
16 to 16.9	19	48.8	15	46.5	13	45.2	18	45.3
17 to 17.9	15	50.9	13	53.5	7	47.5	10	47.0
18 to 18.9	15	49.8	7	48.8	14	55.5	21	50.7
19 to 21.9	28	54.5	17	51.5	19	53.0	23	50.7
22 to 24.9	8	42.5	5	58.2	7	53.0	8	54.2
25 to 29.9	24	53.8	13	54.9	12	52.0	16	48.1
30 to 34.9	18	45.8	14	45.5	7	62.5	14	48.8
35 to 39.9	20	50.9	9	48.2	11	40.0	15	48.8
40 to 44.9	19	52.3	8	51.1	12	53.0	17	50.7
45 to 49.9	13	43.8	11	45.3	8	51.0	15	48.8
50 to 54.9	10	45.5	15	46.3	3		10	41.2
55 to 59.9	7	30.5	9	37.5	3		4	.....

It is unnecessary to comment on the similarity of the three curves in figure 1. The cumulative evidence as to growth and decline is perhaps more striking in this figure than in the later presentation of a smoothed composite. A composite treatment, however, is needed for a comparison of adjacent age groups, and to aid in computing the reliability of differences.

are aware of the tenuous character of their assumption as to a normal distribution of ability in these test functions. However, the methods outlined above appear to provide the most reasonable simple means of combining the data and giving results representative of the total group of cases in the tests. The material probably does not justify more detailed nor more precise treatment.

TABLE 3
SMOOTHED SCALE SCORE MEDIAN^{*}

Test A		Test B		Test C	
Age	Median	Age	Median	Age	Median
11.9	39.3	11.8	34.8		
12.8	45.4	12.6	38.5	12.8	42.2
13.5	48.4	13.3	42.8	13.6	42.5
14.4	49.1	14.4	46.1	14.4	45.3
15.4	49.4	15.4	48.0	15.5	47.5
16.5	49.7	16.6	49.1	16.4	46.5
17.4	50.0	17.3	50.6	17.5	47.4
19.1	51.8	19.0	51.2	18.9	50.1
20.4	52.4	20.5	51.8	20.2	50.8
23.7	51.4	23.5	54.3	23.4	50.7
28.3	50.6	28.6	52.3	28.2	48.9
32.3	49.5	32.1	48.4	32.4	48.6
37.6	50.1	36.8	47.8	37.7	49.5
42.0	50.3	42.8	48.6	42.5	49.8
46.7	47.0	48.3	46.7	46.8	47.2
51.8	42.3	52.3	44.5	50.8	42.8
55.9	35.3	55.7	40.6		

* The arbitrary formula used for smoothing was $\frac{a(n-2)m+cn}{n-2m+n}$. Owing to inequalities in the number of cases at various ages, this process of smoothing frequently tended to move the median from the midpoint of its class interval. It was therefore necessary to use a similar formula on the ages, in order to determine the smoothed age position corresponding to each smoothed median.

THE COMPOSITE DATA

The 765 individual scores, from age 10 to 60, were transmuted into scale scores and grouped by age. The basic measures derived from these composite distributions are presented in tables 4 and 6.⁴

⁴The writers were at first doubtful as to the advisability of including the data from Test C in the composite. The comparability of the scale scores seemed to be in question, for the following reasons:

a. Test C shows a more marked negative skew (even with the multiple choice questions eliminated) than is the case with the other two tests. Since the scale positions are derived from percentiles, the same scale score would be assigned to a 20-percentile performance on any test, although by other methods of deriving sigma a 20-percentile performance on Test C would presumably have a slightly higher scale score than on Tests A and B.

b. Our total number of test records (765) is larger than the total number of persons tested (618), due to the fact that some persons took test C,

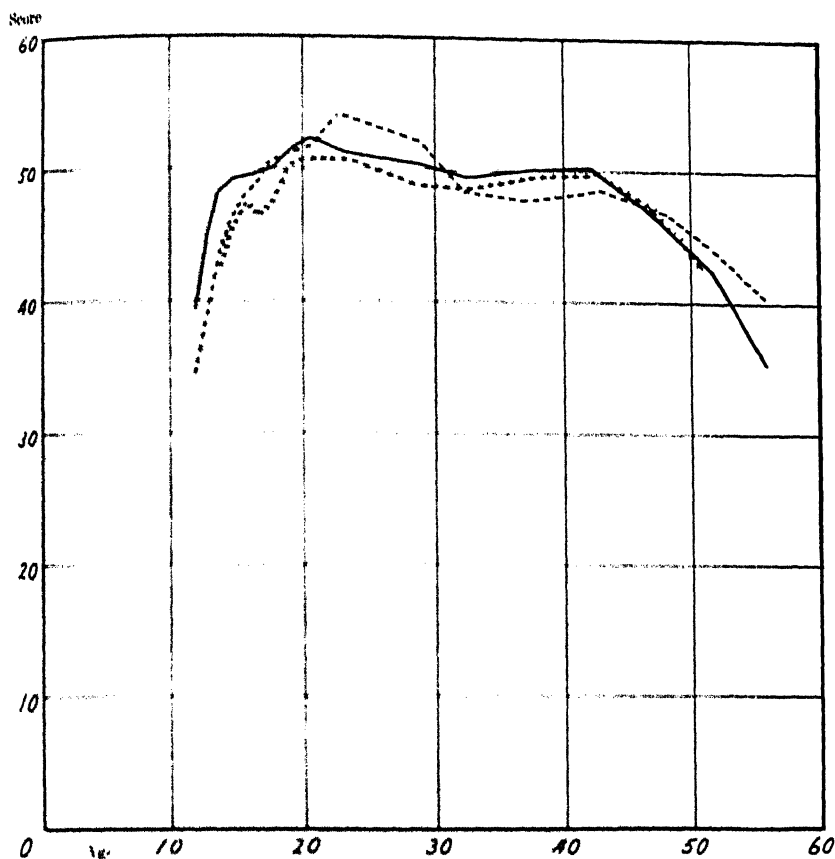


Fig. 1. Individual test medians in relation to age.

— Test A. - - - Test B. . . . Test C.

immediate or delayed, and one of the other tests as well. Under the sampling conditions, this could have no disturbing effect on the curve for the averages. An effect might be produced on the variability curve, if the proportion of "repeats" were very unequal in the different age groups, thus yielding a selective reduction in variability.

c. The inclusion of immediate and delayed scores on Test C may produce a spuriously low average for any age group having an unduly large number of delay cases.

Careful examination of the data showed that the three possible kinds of disproportion did not occur to a degree to vitiate our results. Further justification for including C in the composite is obtained from figure 1, which shows age curves practically identical for the three tests. It should be added that all reliabilities of differences (tables 5 and 7) have been computed on a minimum basis of the number of persons, and not on the total number of test cases. The "chances in 100," as reported, are slightly lower than if this latter basis had been used.

TABLE 4
GROWTH AND DECLINE IN VISUAL MEMORY
Composite scale scores in combined age groups

Age	N	Mean	Medic	S. D.
11-12.9	76	40.2	39.5	9.1
13-14.9	130	45.4	45.6	9.1
15-16.9	94	47.9	48.5	9.2
17-18.9	81	50.8	50.8	9.2
19-24.9	89	52.4	52.5	10.7
25-34.9	99	50.5	49.4	9.7
35-44.9	88	49.8	50.9	9.8
45-54.9	74	44.8	44.7	9.9

TABLE 5
RELIABILITIES OF GAINS AND LOSSES

	Difference	S. D. Difference	Difference S. D. Difference	Change in 100
<i>Gains</i>				
12.0 to 14.0	5.22	1.29	4.04	100
14.0 to 16.0	2.52	1.27	1.98	98
16.0 to 18.0	2.91	1.49	1.95	98
18.0 to 22.0	1.56	1.44	1.08	86
<i>Losses</i>				
22.0 to 30.0	1.95	1.41	1.36	91
30.0 to 40.0	.66	1.41	.46	67
40.0 to 50.0	5.04	1.45	3.47	100

While the treatment in tables 4 and 5 serves to bring out clearly the general age relations, it is possible that, in the process of combining groups, minor but reliable differences may be obscured. Dividing the scores into the age groups used in table 1 makes a closer analysis possible, although at the same time statistical fluctuations are of course increased.

FACTORS INFLUENCING THE AGE CURVE

To what extent may the characteristics of the curve be explained in terms of a special selection at different ages? It should be remembered that the cases were collected as a result of eleven exhibitions in eight different villages. An attempt has been made to discern any possible conditions which might yield a special selection; as discussed on a previous page the only selective factor (readiness to cooperate) which could be detected as influencing our sampling, may be assumed to blur rather than to accentuate the decline beyond 45. If the sampling had been equally adequate at all ages, it appears probable that the deterioration in average scores would have been slightly greater than is actually recorded.

TABLE 6
GROWTH AND DECLINE IN VISUAL MEMORY
Composite Scale Score Measures

Age group	N	Mean	Median	S. D.	Coefficient of variability*
10-10.9	14	31.4	30.7	5.1	16.4
11-11.9	29	36.1	34.0	7.7	21.3
12-12.9	47	42.7	42.5	8.9	20.9
13-13.9	70	44.2	45.0	7.8	17.7
14-14.9	60	46.8	47.0	10.3	21.9
15-15.9	42	48.6	50.4	8.4	17.3
16-16.9	52	47.4	47.0	9.4	19.8
17-17.9	38	51.1	51.1	8.6	16.8
18-18.9	43	50.0	50.5	9.2	18.3
19-21.9	68	52.7	53.0	10.4	19.8
22-24.9	21	51.7	51.5	11.3	21.9
25-29.9	53	52.6	53.3	8.9	16.9
30-34.9	46	48.0	46.4	9.9	20.7
35-39.9	44	48.3	50.0	9.8	20.2
40-44.9	44	51.2	51.7	9.6	18.8
45-49.9	39	46.4	46.1	10.4	22.4
50-54.9	35	43.0	42.9	9.1	21.1
55-59.9	20	39.9	36.8	9.4	23.5

* 100 S. D.
Mean

If our results are to be taken as typical for the rural population studied, we are still left with the problem of the determining factors. The method of formulating test items, as described on a previous page, makes it probable that our scores represent understanding and memory for the picture, and are not disturbed by difficulties in comprehension of the test itself. The question remains as to whether the measurements may not be influenced

TABLE 7
RELIABILITIES OF AGE GAINS AND LOSSES

	Difference between means	S. D. Difference	$\frac{\text{Difference}}{\text{S. D. Difference}}$	Chances in 100
<i>Gain</i>				
10.5 to 11.5.....	4.74	2.24	2.11	98
11.5 to 12.5.....	6.57	2.22	2.95	100
12.5 to 13.5.....	1.53	1.88	.81	79
13.5 to 14.5.....	2.58	1.88	1.37	91
14.5 to 15.5.....	1.80	2.05	.87	81
15.5 to 16.5.....	-1.20	2.02	-.59	27
16.5 to 17.5.....	3.66	2.12	1.72	96
17.5 to 18.5.....	-1.08	2.17	-.49	31
18.5 to 20.5.....	2.70	2.13	1.33	91
<i>Loss</i>				
42.5 to 47.5.....	4.86	2.47	1.96	98
47.5 to 52.5.....	3.42	2.59	1.32	90
52.5 to 57.5.....	3.00	2.99	1.00	84

By Alternate Age Groups

<i>Gain</i>				
10.5 to 12.5.....	11.31	2.15	5.26	100
11.5 to 13.5.....	8.10	1.98	4.09	100
12.5 to 14.5.....	4.11	2.13	1.92	97
13.5 to 15.5.....	4.38	1.80	2.43	99
14.5 to 16.5.....	.60	2.10	.28	61
15.5 to 17.5.....	2.46	2.08	1.18	
16.5 to 18.5.....	2.58	2.12	1.21	
17.5 to 20.5.....	1.62	2.03	.79	79
18.5 to 23.0.....	1.68	2.90	.57	72
<i>Loss</i>				
42.5 to 52.5.....	11.72	2.33	5.03	100
47.5 to 57.5.....	6.43	3.07	2.09	98

by individual differences in the speed of test performance—speed of reading, speed in the selection of answers, and speed of writing. Such factors tend to be minimized by the brevity of the questions and answers, but it may be worth while to make an empirical test of the extent to which they operate.

In Test *B*, two methods were used to reduce or eliminate the factor of speed.

1. Each test paper was re-scored on the basis of the first two-thirds of the questions, 75 per cent of the subjects having reached

TABLE 8
AGE COMPARISONS IN TERMS OF PERCENTAGES
Per Cent at a Given Age Surpassing the Median at Other Ages
(Younger Age Groups)

N	Ages	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5	18.5	20.5
14	10.5	50	29	0	0	0	0	0	0	0	0
29	11.5		50	22	14	7	3	7	3	3	3
47	12.5			50	39	32	26	32	22	25	13
70	13.5				50	36	26	36	23	25	16
60	14.5					50	36	50	33	36	23
42	15.5						50	52	46	50	36
52	16.5							50	37	39	31
38	17.5								50	55	37
43	18.5									50	30
68	20.5										50

(Older Age Groups)

N	Ages	42.5	47.5	52.5	57.5
44	42.5	50	73	81	95
39	47.5		50	65	82
35	52.5			50	70
20	57.5				50

Reading the above table horizontally, we see that of the children from 11 to 11.9 years, 50 per cent (of course) surpass the median at that age, 22 per cent surpass the median of the 12-year-olds, 14 per cent the median of the 13-year-olds, and so on. Reading vertically we see that the 14-year median, for example, is surpassed by none at age 10, by 7 per cent of those at age 11, by 32 per cent of those at age 12, and so on.

or passed this point within the assigned time limits. By considering only the curtailed test, we place a premium upon thoroughness and accuracy, and eliminate any advantage derived from speed in passing into the last third of the test.

2. By the second method, each subject is given credit, proportionally, for whatever he has done. Thus, if he has had time to attempt 10 questions, and has given 5 correct answers, his percentage score is the same as if he had answered correctly 20 out of 40 attempts. Since, in the original test, the maximum score for each item was 2, the formula employed in this re-scoring was $\frac{S}{2A}$, where S equals the original score and A the number of questions attempted. The curves in the above two figures cannot be directly compared with the curves of figures 1 and 2 because

TABLE 9
GROWTH AND DECLINE IN VISUAL MEMORY
Smoothed Composite Scale Score Measures

Age*	Mean	Median	Coefficient variability
10.9	33.3	32.0	18.4
11.8	38.1	36.9	20.6
12.7	42.2	42.1	19.8
13.5	44.5	45.0	19.3
14.3	46.3	47.0	19.8
15.4	47.7	48.5	19.4
16.4	48.4	48.6	18.6
17.4	49.7	49.7	18.1
19.0	51.1	51.5	18.5
20.3	52.0	52.3	19.7
23.5	52.4	52.7	19.4
28.3	51.2	51.2	18.5
32.2	49.3	49.2	19.5
37.4	48.9	49.5	20.0
42.3	49.4	50.0	20.0
47.2	47.0	46.9	21.1
51.7	43.5	42.9	21.9
55.6	41.1	39.0	22.6

* See footnote to table 3.

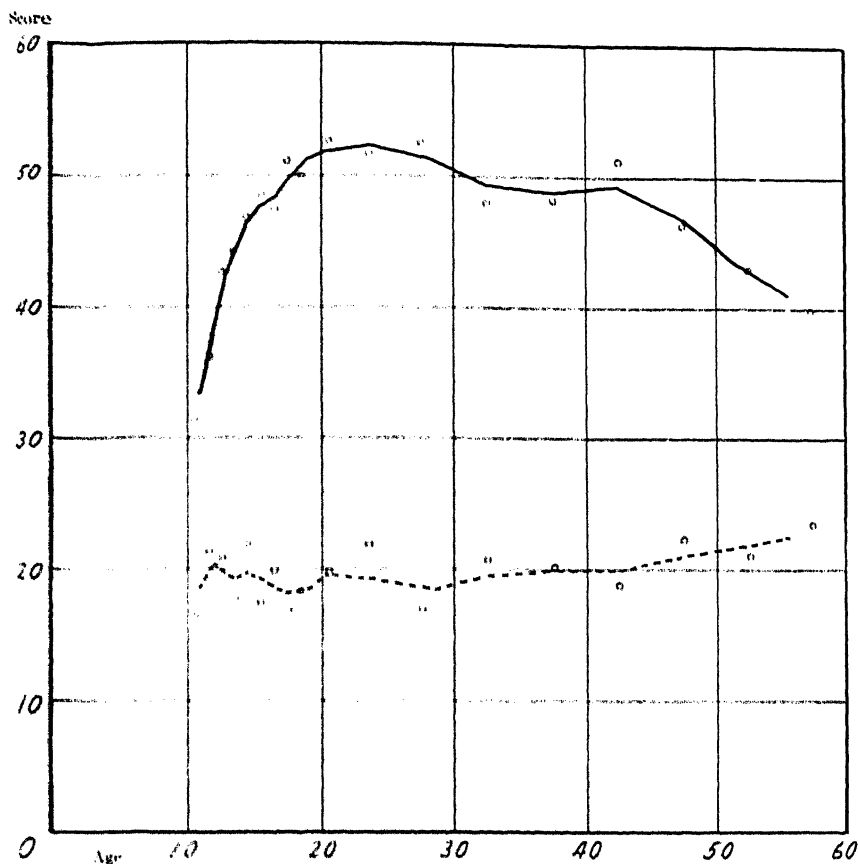


Fig. 2. Growth and decline in visual memory.

— Means. - - - Coefficients of variability.

they are not based upon scale scores. It is evident, however, that their general form is the same. We may conclude that the factor of speed is not exclusively responsible for the age differences in test performance. Speed may differentiate the age groups, but when this factor is removed, the remaining functions involved in the test are about equally differentiating. It should be pointed out, of course, that this analysis has dealt only with the factor of speed in test performance, and not with the speed of perception and of the other processes that may be involved in apprehending the content of the picture.

TABLE 10
TEST *B* MEDIAN COMPUTED BY METHOD 1 (CURTAILED TEST)

Age group		Median	Smoothed median	Age position corresponding to censored median
11-11.9	13	18	18.8	11.8
12-12.9	15	21	22.7	12.6
13-13.9	18	29	29.1	13.3
14-14.9	18	36	34.2	14.4
15-15.9	10	37	38.1	15.4
16-16.9	15	42	41.1	16.6
17-17.9	13	42	42.1	17.3
18-18.9	7	43	44.3	19.0
19-21.9	17	47	47.2	20.5
22-24.9	5	54	48.8	23.5
25-29.9	13	47	43.7	28.6
30-34.9	14	34	38.1	32.1
35-39.9	9	38	37.8	36.8
40-44.9	8	44	38.2	42.8
45-49.9	11	30	29.8	48.3
50-54.9	15	22	24.5	52.3
55-59.9	9	26	24.6	

TABLE 11
TEST *B* MEDIAN COMPUTED BY METHOD 2 (PROPORTIONAL CURTAILED)

Age group	N	Median	Smoothed median	Age position corresponding to smoothed median
11-11.9	13	32	34.8	11.8
12-12.9	15	42	41.9	12.6
13-13.9	18	49	49.6	13.3
14-14.9	18	57	55.7	14.4
15-15.9	10	63	60.7	15.4
16-16.9	15	62	63.9	16.6
17-17.9	13	69	69.7	17.3
18-18.9	7	68	70.2	19.0
19-21.9	17	73	73.4	20.5
22-24.9	5	84	76.1	23.5
25-29.9	13	74	69.5	28.6
30-34.9	14	56	62.4	32.1
35-39.9	9	62	60.9	36.8
40-44.9	8	67	62.1	42.8
45-49.9	11	55	53.5	48.3
50-54.9	15	44	49.2	52.3
55-59.9	9	43	43.4	55.7

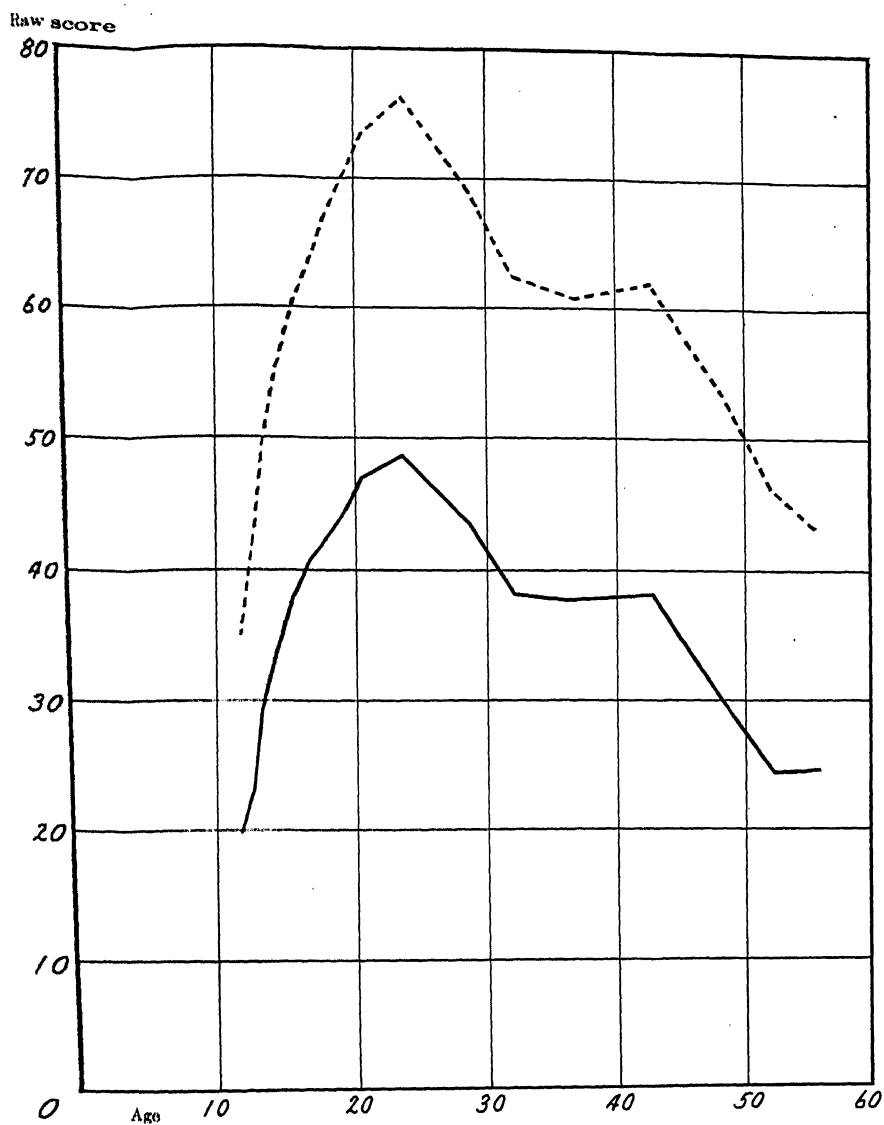


Fig. 3. Age medians with speed penalized. — Curtailed test.
 --- Proportional credit test.

It has been suggested that failing eyesight may be largely or wholly responsible for the decline beyond 45, owing to an increasing average degree of presbyopia and a consequent handicap in reading the test blanks.

As previously stated, the blanks were printed in exceptionally large clear type, and the questions were simple and brief. An ordinary visual handicap would be expected to affect speed to a greater extent than accuracy; hence, the analysis and the conclusions of the preceding paragraph should apply also to the factor of eyesight. A bit of corroborative evidence is available from a study on the army Alpha; individuals in the upper age groups were as inferior on Test 1 (following oral directions) as on tests requiring rapid detailed reading.

Another factor to be considered is the interest value of motion pictures, for different age groups. In our original choice of pictures, an attempt was made to obtain films with a selective age appeal. Our judgment concerning the films was checked by questions on the test papers, dealing with the subject's preferences and his estimates of the picture shown. Film *A* appeals to adolescents at the high school level, and to adults who are attracted by, or are willing to overlook, the somewhat pedagogic motive of the picture. *B* is a superior picture appealing to adults on the basis of rural local color and a dramatic story of character development; children find it rather dull. *C* provokes enthusiasm among children, but its narrative is too naïve to satisfy the more discriminating among adults. In spite of the separation in interest value, the three age curves show a practically identical form. We may conclude that interest value has not been an important cause of age differences in test performance; the average level of attention, at each age and for each picture, is probably sufficiently high to discount differences in emotional responsiveness or in their estimated appreciation of the picture. If this were not the case, the older age groups would undoubtedly show a sharper decrement in Test *C* than in the other two tests.

INTERPRETATION AND SUMMARY

It is obvious that our curves of growth and decline, as plotted, represent extremely complex functions. We have offered no evidence as to the extent to which they are influenced by the growth of intelligence, by keenness of observation, by retention under the given conditions, or by facility of recall under the given conditions. These and other points deserve further elucidation, and will be considered in later reports. In general, the results may be taken as indicating "what people get from the movies," bearing in mind that we are referring to particular pictures, and to concrete verbal-factual products rather than to emotional derivatives.

1. Completion and multiple choice tests were constructed for three moving pictures, covering the verbal and pictorial content of eleven reels.

2. Seven hundred sixty-five test records were obtained from representative rural groups in eight villages, in an age sampling of from ten to sixty years.

3. The reliability of the tests ranges from .89 to .95 in different age groups.

4. In the scores for each test, growth is maintained up to the early twenties; a marked decline occurs beyond the age of forty-five.

5. In a smoothed composite, constructed from sigma scores, development is approximately rectilinear to fifteen, with negative acceleration to the age of twenty-three.

6. In the age group from forty-five to sixty, the composite scores show a rectilinear decrease; by the age of fifty-five, the median has dropped to a position below the average for thirteen years.

7. The coefficient of variability is approximately constant, increasing slightly in the upper ages.

8. The general form of the age curve is not due to special selection within the communities studied.

9. The inferiority of the older groups is not due to a speed handicap in performing the tests, nor to factors involving interest in the pictures, visual acuity, or education.

UNIVERSITY OF CALIFORNIA PUBLICATIONS
IN
PSYCHOLOGY

Vol. 3, No. 7, pp. 245-276, 2 figures in text

Vol. 3, No. 8, pp. 277-284

November 22, 1929

PSYCHOLOGICAL STUDIES OF
MOTION PICTURES

III. FIDELITY OF REPORT AS A MEASURE OF
ADULT INTELLIGENCE

IV. THE TECHNIQUE OF MENTAL-TEST SURVEYS
AMONG ADULTS

BY

HERBERT S. CONRAD AND HAROLD ELLIS JONES

UNIVERSITY OF CALIFORNIA PRESS
BERKELEY, CALIFORNIA

1929

UNIVERSITY OF CALIFORNIA PUBLICATIONS

Note.—The University of California Publications are offered in exchange for the publications of learned societies and institutions, universities and libraries. Complete lists of all the publications of the University will be sent upon request. For sample copies, lists of publications or other information address the **MANAGER OF THE UNIVERSITY PRESS, BERKELEY, CALIFORNIA, U. S. A.** All matter sent in exchange should be addressed to **EXCHANGE DEPARTMENT, UNIVERSITY OF CALIFORNIA LIBRARY, BERKELEY, CALIFORNIA, U. S. A.**

Publications of the University of California Press may also be obtained from **THE CAMBRIDGE UNIVERSITY PRESS, FETTER LANE, LONDON, E.C. 4, ENGLAND**, to which orders originating in Great Britain and Ireland should be sent.

PSYCHOLOGY.—George M. Stratton, Warner Brown, and Edward C. Tolman, Editors.

Price per volume, \$3.50.

Vol. 1.	1. The Judgment of Difference, with Special Reference to the Doctrine of the Threshold, in the Case of Lifted Weights, by Warner Brown. Pp. 1-71, 4 text figures. September, 1910	\$0.50
	2. The Process of Abstraction, an Experimental Study, by Thomas Verner Moore. Pp. 73-197, 8 text figures. November, 1910	1.00
	3. The Judgment of Very Weak Sensory Stimuli, with Special Reference to the Absolute Threshold of Sensation for Common Salt, by Warner Brown. Pp. 199-268, plates 1-4. February, 1914 .....	.60
	4. Habit Interference in Sorting Cards, by Warner Brown. Pp. 269-321. April, 1914 .....	.50
	5. Diurnal Variations in Memory and Association, by Arthur I. Gates. Pp. 323-344. March, 1916 .....	.20
	6. Correlations and Sex Differences in Memory and Substitution, by Arthur I. Gates. Pp. 345-350. May, 1916 .....	.05
Vol. 2.	1. Variations in Efficiency during the Day, together with Practice Effects, Sex Differences, and Correlations, by Arthur I. Gates. Pp. 1-156. March, 1916	1.50
	2. Experiments on Attention and Memory, with Special Reference to the Psychology of Advertising, by J. M. Levy. Pp. 157-197. March, 1916 .....	.40
	3. The Psychology and Physiology of Mirror-Writing, by Justin K. Fuller. Pp. 199-265. May, 1916 .....	.70
	4. Memory and Association in the Case of Street-Car Advertising Cards, by Walter S. Heller and Warner Brown. Pp. 267-276. May, 1916 .....	.10
	5. A Comparison of the Japanese Folk-Song and the Occidental: A Study in the Psychology of Form, by Sangoro Ito. Pp. 277-290. May, 1916 .....	.15
	6. Individual and Sex Differences in Suggestibility, by Warner Brown. Pp. 291-430. July, 1916	1.50
Vol. 3.	1. An Experimental Study of Abnormal Children, with Special Reference to the Problems of Dependency and Delinquency, by Olga Bridgman. Pp. 1-59. March, 1918 .....	.65
	2. Analysis of Package Labels, by Walter S. Heller. Pp. 61-72, plates 1-3. January, 1919 .....	.18
	3. A Study of the Major Emotions in Persons of Defective Intelligence, by Beniah May Morrison. Pp. 73-145. December, 1924 .....	.90
	4. Factors Contributing to the Delinquency of Defective Girls, by Jean Walker. Pp. 147-213. April, 1925 .....	.85
	5. The Judgment of Pitch as a Function of the Series, by Stanley R. Truman and E. G. Wever. Pp. 215-223. June, 1928 .....	.25
	6. Psychological Studies of Motion Pictures. II. Observation and Recall as a Function of Age, by Harold Ellis Jones, assisted by Herbert Conrad and Aaron Horn. Pp. 225-243, 3 figures in text. August, 1928 .....	.25
	7. Psychological Studies in Motion Pictures. III. Fidelity of Report as a Measure of Adult Intelligence, by Herbert S. Conrad and Harold Ellis Jones. Pp. 245-276, 2 figures in text.	
	8. Psychological Studies in Motion Pictures. IV. The Technique of Mental-Test Surveys Among Adults, by Herbert S. Conrad and Harold Ellis Jones. Pp. 277-284.	
	Nos. 7 and 8 in one cover. November 1929 .....	.50

UNIVERSITY OF CALIFORNIA PUBLICATIONS
IN
PSYCHOLOGY

Vol. 3. No. 7, pp. 245-276, 2 figures in text

November 22, 1929

PSYCHOLOGICAL STUDIES OF
MOTION PICTURES

III. FIDELITY OF REPORT AS A MEASURE OF
ADULT INTELLIGENCE

BY
HERBERT S. CONRAD AND HAROLD ELLIS JONES

CONTENTS

	PAGE
Introduction	245
The Tests	246
Sampling	248
Presentation of Results	251
Comparison of Motion-Picture Tests with Other Intelligence Tests	263
General Conclusions	273

INTRODUCTION

The data included in this study were gathered during the summers of 1925 and 1926, in connection with a series of community research projects in Massachusetts, New Hampshire, and Vermont. Other phases of this investigation have been elsewhere reported.

At the time of the beginning of the general survey, motion pictures were used primarily as a means of attracting groups to a community center. In rural districts where the commercial development of the cinema is still relatively new, it has been shown that a free entertainment provides a convenient method of assembling random samples.⁽¹⁾ The motion-picture program

serves not only to procure attendance, but also to create an atmosphere of public good will, in which a schedule of tests or questionnaires can be administered under standard conditions and with a fair degree of motivation.

The total project was made possible by grants from the Council for Research in the Social Sciences, Columbia University. Acknowledgments are due to Professors R. S. Woodworth and A. T. Poffenberger, of Columbia University, for advice and administrative assistance, and to the Yale University Press for the loan of certain film material from the "Chronicles of America Series."¹

THE TESTS

The motion-picture audiences were given two kinds of tests: at the first gathering, a motion-picture "questionnaire"—designed to introduce and accustom the audience to mental-test methods, and to measure their comprehension and memory for two or more reels of pictures; and at the second gathering, the Army Alpha intelligence test (either form 5 or form 7). Each individual subtest of the Alpha was preceded by the usual standard directions, and standard timing was used. In order to secure better cooperation, however, the purpose of the Alpha was defined in relation to a practical problem of motion-picture projection. At the top of each Alpha blank was pasted a printed slip bearing the following statement:¹

TESTS OF SPEED OF VISION

We want to see how rapidly you can do these tests. Perhaps you have noticed in the movies that the pictures or titles are shown sometimes too fast, sometimes too slow. We want to know how fast you read and understand words, etc., so that we will know the proper rate for running title

¹ The problem here indicated was of course a real problem, and could be readily comprehended by our subjects, many of whom were in the habit of complaining about the disturbing speed of movie captions. The other purposes of our tests were less easy to explain because of technical implications, and also because of the danger of discussing "intelligence" in a heterogeneous group. It was thought that the best results would be obtained if all issues were avoided which might lead to self-reference and inferiority feelings among the over-sensitive or among the actually inferior members of the group.

on the screen. We do not care about the individual results, but it is important that we get a fair average, so be sure to work as fast—and as accurately—as you can.

A detailed description of the motion-picture tests has been given in a previous article;⁽²⁾ from their form and content the three motion-picture questionnaires (tests A, B, and C) may be regarded virtually as examinations of fidelity of report. Time limits were assigned to each motion-picture test as follows: Test A, 11 minutes; B, 14 minutes; C, 14 minutes. With this timing, about 5 per cent finished test B, 20–25 per cent finished test A, and 80–85 per cent finished test C. (Test C consisted of items of curtailed range of difficulty, and was inadequate in discriminating between individuals, although it was effective in differentiating age groups). In all the tests, the groups were instructed to “be as careful as you can” “work rapidly,” “if some of the questions are too hard leave them alone and go on to the next one, but do as well as you can.”

As previously stated,⁽²⁾ our tests attempted to cover all phases of the motion pictures—pictorial, captional, essential, non-essential, focal, incidental, etc. The questions did not attempt to emphasize such parts of the motion pictures as might seem best adapted to intelligence-testing purposes, nor were they devised with a view to measuring language ability, auto-criticism, problem-solving ability, intellectual discrimination, or the other assumed aspects of intelligence. It is therefore clear that our data will understate rather than overstate the possibilities of a motion-picture questionnaire in serving as an intelligence test. The necessity of keeping the questionnaires short, in order to maintain the good will of our audiences (which had of course come primarily to be entertained rather than to be tested), also prevented us from making the fullest possible use of the available testing material in the motion pictures.

It will be clear to the reader that, if motion-picture tests can be used substitutively for such a standard test as the Army Alpha, the practical consequences may be of considerable importance in surveys with adults, where the chief obstacle has hitherto been in the control of interest and rapport.

SAMPLING

The motion-picture tests A and B were given in rural Vermont to 420 subjects aged 10-59 years inclusive, who returned 515 test papers (some of the subjects taking more than one test). In each community the Army Alpha was also given, yielding 218 cases in which an Alpha score and a score on either test A or test B were available. The Army Alpha was administered, in all, to 1197 subjects in rural Massachusetts, New Hampshire, and Vermont (ages 10 to 60). This last sample we feel entitled to consider, on the basis of both a priori considerations and objective criteria, as fairly representative of central and northern New England.²

The question arises as to whether our motion-picture samples are fair and typical. Can a series of motion-picture exhibitions be managed so as to attract a fair sample of a rural community? At such exhibitions, can tests on the content of the motion pictures be employed for the measurement of intellectual, emotional, or social traits? If so, we have in this technique a possibly significant contribution to survey methods, with applications over a wide range of problems in the social sciences.

A priori, the motion-picture audiences would be expected to be as typical as those included in the total Alpha sampling, for closely similar administrative methods were employed. An objective measure of the sampling in tests A and B can be obtained from the occupational distribution. (Table 1.) Since the motion-picture audiences consisted chiefly of family groups, a classification of the adult males will provide a fair index of the total sample.

The occupational normality of our group may be appraised further by a comparison with the United States census data for

²Details as to the representativeness of the towns selected, in such important characteristics as population, racial origin, occupational distribution, literacy, education, and rate of emigration, may be found in Jones.⁽⁸⁾

Vermont. (Table 2.) Only the more definitive and important classifications of the census have been taken; the percentages therefore do not total to 100 per cent but to around 85 per cent in each case.

TABLE 1
OCCUPATIONAL DISTRIBUTION OF ADULT MALES IN THREE SAMPLES*

	I Main Alpha sample	II Those taking test A or test B	III Those taking test A and Alpha, or test B and Alpha
	<i>per cent</i>	<i>per cent</i>	<i>per cent</i>
Professional group (minister, dentist lawyer, etc.)	4.6	3.2	5.7
"Technicians" (telephone engineer, scenic painter, etc.).....	4.6	3.2	5.7
Small-business executives (retail dealers, mill owners, postmaster, section foreman, etc.).....	10.8	5.4	8.6
Skilled laborers (mechanic, painter, plumber, carpenter, etc.).....	10.8	8.6	11.4
Farmers.....	41.5	52.7	51.4
Semi-skilled laborers (truck driver, trainman, mail carriers, store clerk, etc.).....	15.1	14.1	11.4
Unskilled laborers (general laborer, teamster, woodcutter, etc.).....	12.2	4.3	5.7
Unclassified	0.0	8.6	0.0

* Column I includes 277 males, ages 20 to 64. Column II includes 93 cases, 14 of whom took both test A and test B and hence are counted twice. Column III includes 35 cases, 8 of whom took the Alpha and both test A and test B, and hence are counted twice.

TABLE 2
COMPARISON OF THE TEST SAMPLES WITH THE OCCUPATIONAL DISTRIBUTION
FOR VERMONT

	U. S. census adult males of Vermont	Those taking test A or test B	Those taking test A and Alpha, or test B and Alpha
	<i>per cent</i>	<i>per cent</i>	<i>per cent</i>
Agriculture.....	44.1	52.7	51.4
Manufacturing and mechanics..	29.0	18.3	22.9
Trade.....	8.8	5.4	8.6
Professions.....	3.2	5.4	5.7

It will be noted that our sample is slightly more "agricultural" and slightly less "industrial" than the sample represented in the census. This is due to the fact that our survey was limited to rural districts, while the census includes also the relatively few urban centers of Vermont.

An objective check on the 218 cases used in our validity study (cases taking both a motion-picture test and an Alpha) is the age distribution of these cases—especially as compared with the total 515 cases taking test A or test B. These distributions follow.

TABLE 3
AGE DISTRIBUTION OF MOTION-PICTURE SAMPLES

Age	Number taking test A or test B			Number taking test A and Alpha, or test B and Alpha		
	Male	Female	Total*	Male	Female	Total†
10-11.....	16	17	33	8	6	14
12-13.....	39	43	82	27	20	47
14-15.....	35	33	68	10	19	29
16-17.....	29	33	62	19	11	30
18-19.....	23	17	40	6	7	13
20-29.....	40	37	77	14	14	28
30-39.....	26	35	61	8	15	23
40-49.....	22	29	51	10	12	22
50-59.....	13	28	41	3	9	12
Total.....	243	272	515	105	113	218

* 95 persons took both test A and test B. These persons have been counted twice, once under test A, and once under test B.

† 59 persons took both test A and Alpha, and also test B and Alpha. These have been counted twice.

It appears from table 3 that the adolescents attended the motion pictures in relatively larger numbers than the adults; this numerically fuller sample of younger persons does not imply any reduction in the representativeness of the adult sample. We may, on the contrary, conclude, in view of all the available evidence, that the technique employed is adequate for obtaining a fair adult sample in northern rural regions.

As will be shown in the following sections, an extremely close agreement was found in the results with test A and test B. This may be taken as evidence that our findings are stable and sufficiently reliable, in spite of a total validity sample consisting of only 218 cases.

PRESENTATION OF RESULTS

The results will be presented according to the following outline:

A. The fundamental statistical constants derived from the frequency distributions.

B. Validity-coefficients: the correlation between motion-picture tests and the Army Alpha intelligence test.

C. Age curves.

D. The correlation between age and the motion-picture test scores.

E. The correlation of Alpha scores with age.

F. The reliability of the Army Alpha intelligence test.

G. The reliability of the motion-picture tests.

H. The effect of increasing the length of the motion-picture tests upon their reliability and validity.

I. The multiple correlation between two motion-picture tests and intelligence.

It may be mentioned in passing that the statistical treatment in this article, while somewhat full, is almost entirely elementary, and no more than barely adequate.

A. *The fundamental statistical constants derived from the frequency distributions*^a are presented in tables 4 and 5. The adults are seen to be consistently superior to the juveniles in

^a The motion-picture tests were marked according to a written standard which was prepared from an adequate sampling of replies. A correct answer on a test question counted 2, an omission or a wrong answer counted 0; half-credits of 1 were also occasionally assigned, according to standard. A weighting project was later carried out whereby each question was given a weight proportionate to its discriminatory power. The test scores based on the weighted items failed, however, to yield a significantly higher correlation with the Army Alpha. As a result, the treatment in the present section employs only the unweighted scores.

TABLE 4
GROUP TAKING TEST A* AND ALPHA

	Total group: Ages 10-54 (n=107)					Ages 17-54 (n=56)				
	Mean	Median	Model	S. D.	C. V.†	Mean	Median	Model	S. D.	C. V.†
Test A.....	46.1	45.4	44.0	18.4	.399	42.8	43.4	44.6	17.4	.407
Total Alpha.....	92.0	87.9	79.7	40.0	.421	81.7	80.0	76.5	33.5	.410
	6.6	6.6		2.44	.370	Alpha test § 1.....				
	9.3	9.2		3.35	.360	Alpha test § 2.....				
	8.8	8.2		3.57	.406	Alpha test § 3.....				
	13.4	11.5		8.95	.668	Alpha test § 4.....				
	12.4	12.1		6.11	.493	Alpha test § 5.....				
	7.9	7.7		3.71	.470	Alpha test § 6.....				
	18.0	15.4		10.52	.584	Alpha test § 7.....				
	18.8	17.8		9.43	.502	Alpha test § 8.....				
					.482	Average				
										.465

* Maximum possible score for test A is 50.

† The modes were computed by formula 4b on page 62 of reference 5. They are presented for the principal distributions in order to aid in the visualization of the frequency curves.

‡ Coefficient of relative variability: S. D. divided by mean. It may be noted that the coefficients of variability for the motion-picture tests are higher than those reported for the same tests on page 235 of reference 2. This is due to the fact that in this reference the coefficients were computed from T-score distributions instead of from the raw scores.

§ The eight subtests of the Alpha are in this report sometimes called test 1, test 2, etc., and sometimes subtest 1, subtest 2, etc.

|| If calculated from the data here given, this is 79.6. The figure 79.7 is secured when additional decimals (not given above) of the mean and median are taken into account.

TABLE 5
GROUP TAKING TEST B* AND ALPHA

	Total group: Ages 10-54 (n=111)						Ages 10-16 (n=53)						Ages 17-54 (n=58)					
	Mean	Median	Mode	S. D.	C. V.		Mean	Median	Mode	S. D.	C. V.		Mean	Median	Mode	S. D.	C. V.	
Test B.....	44.7	42.5	38.0	19.7	.441		37.9	35.5	30.6	17.4	.459		50.9	49.2	45.7	19.7	.387	
Total Alpha.....	98.1	90.7	75.6	40.0	.421		83.0	82.5	81.5	31.1	.375		111.9	113.6	117.1	42.6	.381	
	7.0	7.2		2.17	.310	Alpha test 1						7.2	7.5			2.25	.313	
	9.6	9.2		3.13	.326	Alpha test 2						10.6	10.7			3.44	.325	
	9.1	8.6		3.71	.408	Alpha test 3						10.7	10.7			3.56	.333	
	15.2	13.1		9.58	.630	Alpha test 4						19.3	18.6			10.39	.538	
	13.2	12.8		6.59	.499	Alpha test 5						14.0	14.0			7.66	.547	
	8.7	8.7		3.87	.445	Alpha test 6						9.6	9.3			4.49	.468	
	19.3	18.2		10.69	.554	Alpha test 7						20.7	23.0			11.73	.567	
	19.5	18.5		9.53	.489	Alpha test 8						23.6	23.5			9.15	.388	
					.458	Average											.435	

* Maximum possible score for test B is 96.

measures of central tendency. The juveniles yield a higher C. V. (coefficient of relative variability) in tests A and B, and a slightly lower C. V. in Alpha scores; these differences are not statistically reliable. Nearly all the distributions are slightly skewed to the right (as judged by the difference between the mean and median); such a skewness seems characteristic of a fair sample of adult community intelligence, when measured by a test like the Army Alpha.⁽⁴⁾

The division of the test group at age 17 was made for the purpose of statistical convenience. From 10 to 17 years the validity coefficients can be treated by the simple partial correlation formula, to eliminate the influence of age; had the juvenile group extended to 20 or beyond, the more cumbersome partial correlation *ratio* would have been required, owing to the curvilinear tendency of the age-score regression line. For the group 17-54 years, no partialing is necessary, and this was the reason for setting the age limit at 54 years instead of later.

B. *Validity coefficients: the correlation between motion-picture tests and the Army Alpha intelligence test.*—The coefficients of correlation⁴ between motion-picture test scores and Alpha scores are as follows:

TABLE 6
VALIDITY COEFFICIENTS

Test A×Alpha				Test B×Alpha			
Ages	r	PEr	n	Ages	r	PEr	n
10-54.....	.687	.034	107	10-54.....	.712	.032	111
10-16.....	.642	.052	59	10-16.....	.640	.055	53
10-16 (age partialized out).....	.710*	.052	59	10-16 (age partialized out).....	.621*	.076	53
17-54.....	.667	.054	48	17-54.....	.690	.046	58

* The partial correlations in the juvenile group deserve some explanation. By the usual formula, the correlation of test A by Alpha, with age constant, is .588±.057, and of test B by Alpha, with age constant, .462±.073. But when age is held constant, the S. D. of the juvenile group is materially decreased, both in Alpha and in movie score. In order to make these coefficients comparable with the partial correlations obtained for the adult group, it was necessary to correct for reduced variability by applying formula 187 (5), with the results as shown in table 6.

⁴ Unless otherwise noted, all correlations are Pearson *r*'s; all relations are linear; no corrections to the S.D.'s for errors-of-grouping were made.

The coefficients in table 6 require no special comment. Ranging in the neighborhood of .7 for both juveniles and adults, they are sufficiently high to be regarded as significant and to some extent practically serviceable.

Confirmatory results for test A have been obtained by Jones in a study of 300 sixth-class high school students in Brooklyn, N. Y. After correction for variability,⁽⁶⁾ the validity coefficients of his urban group are found to be close to those obtained in our rural sample.

C. *Age curves*.—A further similarity between the Alpha and the motion-picture tests may be noted in the curves for test performance plotted in relation to age. Figure 1 gives the smoothed⁵ curves for test A, test B, and the Army Alpha, based on median T-scale scores. The source of this material may be found in prior reports.⁽⁷⁾ While the several smoothed curves show a fairly striking degree of resemblance, a more regular and systematic agreement is obtained if curves are fitted by the method of least squares. Curve-fitting is perhaps a more laborious process than the data justify, but the results are given for what interest they may have. Figure 2 presents a sixth-power curve for 1197 cases taking the Army Alpha, and a fifth-power curve for 765 cases pooled in a composite for tests A, B, and C. No comment is required, except possibly with reference to the separation of the curves at the extremes; as has been elsewhere indicated, this is probably due in some measure to the influence of selective factors in the youngest and oldest age groups of the Alpha sampling. Mention should also be made of the influence of the information elements of the Alpha, particularly test 4 (vocabulary) and test 8 (general information); these have a conspicuous influence in retarding the decline of the total Alpha

⁵ The arbitrary formula used for smoothing was $\frac{an_a + 2bn_b + cn_c}{n_a + 2n_b + n_c}$ where a , b , and c are T-score medians for three contiguous age groups; and n_a , n_b , and n_c are the number of cases occurring in these age groups, respectively. Owing to inequalities in the number of cases at various ages, it was necessary to employ a similar formula to determine the age position corresponding to each smoothed median.

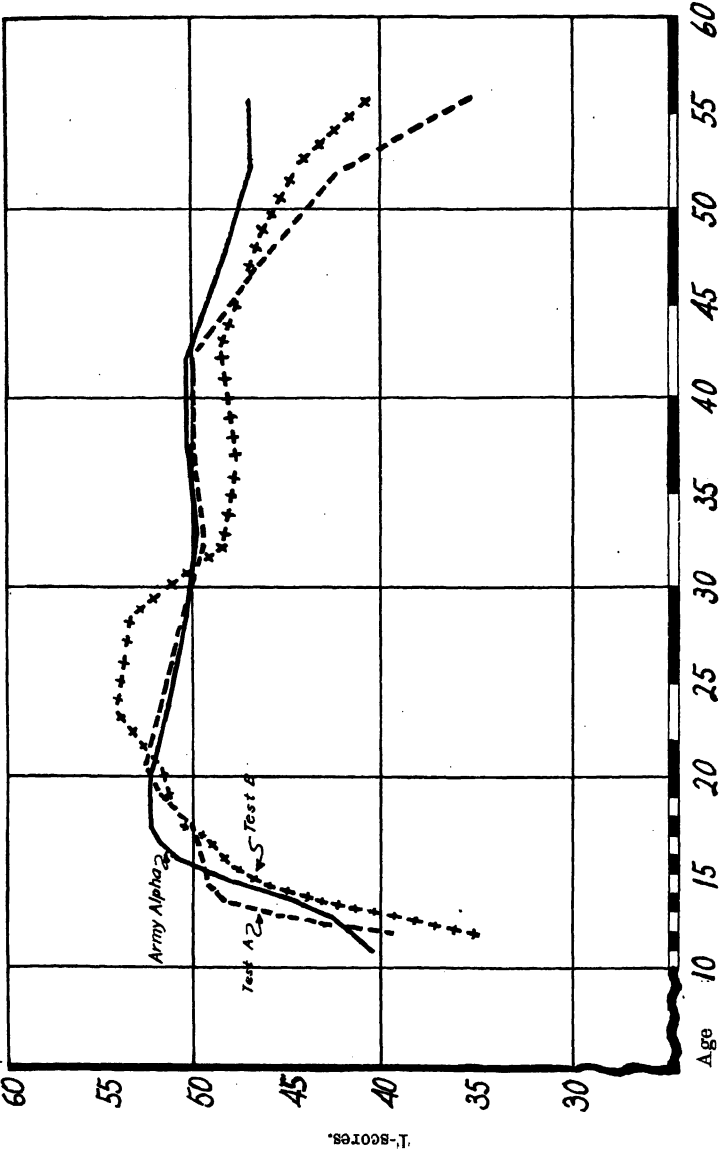


Fig. 1. Age Curves for Test A, Test B, and Army Alpha (Smoothed).

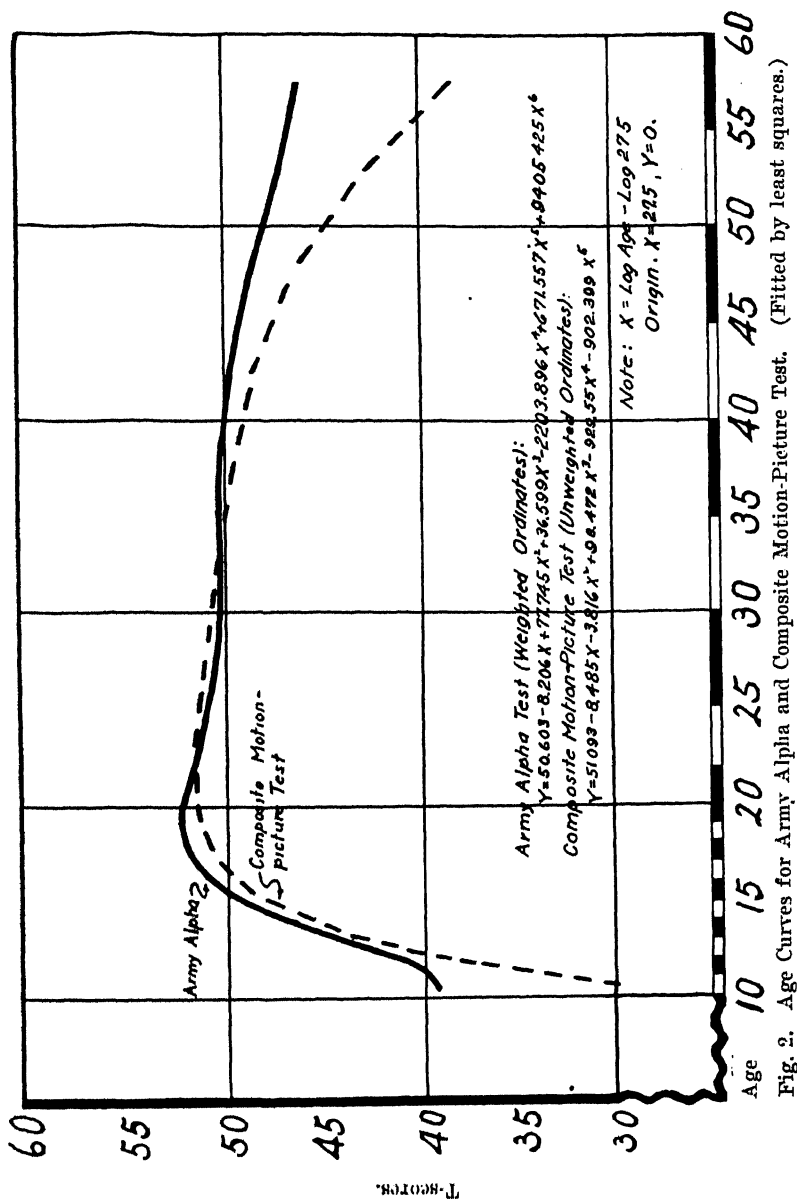


Fig. 2. Age Curves for Army Alpha and Composite Motion-Picture Test. (Fitted by least squares.)

score after middle age. It is interesting to note that of all the components of the Alpha, test 7 (analogies) is regarded by many as the best single measure of intelligence; the age curve for this test shows the closest resemblance to the curves for tests A and B.

D. *The correlation between age and the motion-picture test scores.*—When the age function is treated in terms of correlation, we obtain the following:

TABLE 7

	Age 10-16		Age 17-54	
	<i>r</i>	P. E.	<i>r</i>	P. E.
Age×test A.....	.338	.078	— .221	.093
Age×test B.....	.574	.062	— .263	.097

In the age-group 17-54 the scores tend to increase up to the early twenties, and to diminish beyond, with a notable decrement after 45. This is illustrated by the curves presented in figures 1 and 2. It is, then, apparent that the negative correlations for this age group are really a *resultant* of a small positive correlation for the ages 17-22, and a negative correlation for the ages 40-54. In the treatment of the validity coefficients, however, the degree of curvilinearity in the adult group is not sufficiently great to justify the use of the correlation-ratio. When the simple partialing formula is used (assuming rectilinearity), the correlation of test A × Alpha for the group 17-54 does not drop at all, and the correlation between test B and Alpha drops only .01. For purposes of the validity analysis, it seems permissible to employ the zero order coefficients.

E. *The correlation of Alpha scores with age.*—

TABLE 8

	Age 10-16		Age 17-54	
	<i>r</i>	P. E.	<i>r</i>	P. E.
Age×Alpha (in group taking test A and Alpha).....	.635	.052	-.063	.097
Age×Alpha (in group taking test B and Alpha).....	.575	.062	-.239	.084

F. *The reliability of the Army Alpha intelligence test.*—This was not determined directly for our groups. However, a “split-half” correlation made in another connection by Jones⁽³⁾ yielded a reliability-coefficient of .977. Part of Jones’s sample ($n=102$) lived in the same districts in which our motion pictures were exhibited; and part of the sample lived in (socially) comparable Massachusetts villages which, however, averaged slightly lower in Alpha score. When a correction is made for difference in variability, the reliability coefficient for the adults in the present sample becomes .974, and for the juveniles (ages 10-16), .954.

G. *The reliability of the motion-picture tests.*—All the reliability-coefficients which are presented below were obtained by a controlled “split-half” technique. In order to secure valid reliability coefficients by this method, it is theoretically essential to secure similar and comparable test halves. In choosing items to be paired against each other, the following factors were considered: (a) equality in difficulty (objectively determined by tabulating the incidences of success and failure in each question); (b) physical proximity, in the questionnaire, of the questions paired; (c) proximity in the moving pictures, of the episodes the questions on which were to be made into a pair; (d) similarity of question type (i.e., whether based on a pictorial, captioned, essential, or incidental part of the moving picture); (e) the intercorrelation between the questions (deter-

mined only roughly and subjectively by the person scoring the tests). In the case of conflict of any of the foregoing criteria, the decision was usually based on similarity in difficulty. In general, it was not hard to secure satisfactory question pairs.

The comparability of the two test halves, derived by the method just stated, may in every case be gauged from the data presented with the reliability coefficients. The same question pairs were used for both males and females, both juveniles and adults, and both immediate and delayed tests. (Test C, on "The Loaded Door,"⁶ was administered to some audiences *a week after* the exhibition of the picture, instead of immediately. No warning of the delayed test was given.)

The reliability data for the total group follow:

TABLE 9
RELIABILITY COEFFICIENTS AND RELATED DATA. AGE GROUP 10-54

Motion picture		<i>n</i>	Mean*	Median	S. D.	<i>r</i> First half × second half	Reli- ability coeffi- cient
Test A	First half	107	22.9	24.1	9.7	.88	.94
	Second half		22.9	22.4	9.6		
Test B	First half	111	21.8	21.3	10.3	.85	.92
	Second half		22.5	23.0	9.9		
Test C (immediate test)	First half	153	24.8	26.4	5.4	.82	.90
	Second half		24.5	26.2	5.6		
Test C (delayed test)	First half	94	21.5	23.2	7.1	.89	.94
	Second half		20.9	22.8	6.7		

* The maximum score obtainable on each half of a total test is as follows:

Test A..... 40 Test B..... 48 Test C..... 30

⁶ The data yielded by test C, while not used for any correlations with intelligence, may nevertheless be used in a study of motion-picture test reliability. We have done this, in order to make our generalizations more obviously valid.

In the case of test A and test B, data upon reliability are also available for the age group 10-16, as contrasted with the age group 17-54. The reliability coefficients and other related data for these two age groups are as follows:

TABLE 10
RELIABILITY COEFFICIENTS AND RELATED DATA
AGE GROUPS 10-16 AND 17-54

	<i>n</i>	Mean	Median	S. D. of each half	S. D. of total test	Reli- ability coeffi- cient	Reliability coefficient of group 10-16 corrected for variability*
First half	59	21.6	21.8	9.3	17.4	.92	.93
Test A, ages 10-16 Second half		21.9	22.2	9.4			
First half	48	25.6	27.0	9.6	18.9	.95	
Test A, ages 17-54 Second half		25.3	24.6	9.5			
First half	53	18.3	17.8	9.2	17.4	.91	.93
Test B, ages 10-16 Second half		20.2	18.5	8.7			
First half	58	25.9	26.5	9.9	19.7	.92	
Test B, ages 17-54 Second half		25.5	25.3	10.2			

* The variability of the juveniles being smaller than that of the adults, the reliability coefficient of the juveniles was corrected for this factor by the use of formula 61 of reference (8).

The preceding evidence indicates that, by the current criteria for group tests, the motion-picture tests are fairly adequately reliable, both for juveniles and for adults. The short testing time required of the audience (14 minutes for test A, 11 minutes for B, and 14 minutes for C) makes this degree of reliability especially significant.

H. *The effect of increasing the length of the motion-picture tests, upon their reliability and validity.*—With reliability coefficients ranging from .90 to .95, the probable error of measurement⁽⁹⁾ is still from .21 to .15 times the standard deviation of

the total distribution. What would be the effect upon the probable error of measurement of the motion-picture tests, and upon the correlation of these tests with the Alpha, if we were to double their length?

The reliability of the double-length tests may be computed as varying from .95 to .97;⁽¹⁰⁾ with these coefficients, the probable error of measurement is reduced to from .15 to .12 times the standard deviation of the total distribution. This improvement may seem well worth securing. These results, however, are perhaps mathematical rather than psychological; for if, in a longer test, the cooperation of the audience were less stable and uniform than in a shorter test, then the reliability of the lengthened test would of course fall short of that predicted by the Brown-Spearman formula.

The effect of doubling the length of the motion picture tests, upon their correlation with Alpha, is practically negligible. If we assume an initial reliability of .92 and a validity coefficient of .68, then the following table shows the effect of an increase in length:

VALIDITY-COEFFICIENTS

Initial test.....	.68
Double-length.....	.664
Triple-length.....	.660

While this gain is insignificant, we should bear in mind the fact that a mere lengthening of the motion-picture tests is by no means the only possible way of improving them from an intelligence-testing point of view. Specific as well as general suggestions for increasing their validity, are presented in full in reference (1).

I. *The multiple correlation between two motion-picture tests and intelligence.*—It is of course possible to use a *team* of motion-picture tests as a measure of intelligence. The correla-

tion between tests A and B may be taken, for the adult group, as about .63.⁷⁽¹¹⁾ Using this, and the other appropriate data for the adult group in tables 4, 5, and 6, we find that the multiple-R between Alpha and (test A plus test B) is .75. This multiple-R, while subject to some difficulty of interpretation from the standpoint of statistical theory (since the causation between intelligence and motion-picture test performances cannot be considered unilateral),⁽¹²⁾ is nevertheless of interest and some value.

COMPARISON OF MOTION-PICTURE TESTS WITH OTHER INTELLIGENCE TESTS

The motion-picture tests have the prime virtue of being both shorter⁸ and more acceptable to an unselected group of adults than is the case with such a standard intelligence test as the Army Alpha. The question arises, *At what expense have shortness and acceptability been won?* Are the movie tests much less valid than other intelligence tests, like the Alpha, which measure an equally wide range⁹ of intelligence? And if less valid than other intelligence tests, could a motion-picture test be substituted for one of the longer and less acceptable subtests of a standard instrument of measurement? To answer these questions we propose to make a comparison between our validity coefficients and the following sets of correlations:

A. The Stanford-Binet with other intelligence tests.

B. The correlation of each subtest of the Alpha with the sum of the other subtests of the Alpha.

⁷ This correlation is none too reliable, being based on a population of only 43 cases, ages 16-50.

⁸ We are not considering the time required to exhibit each motion picture as part of the test time. From the point of view of the subjects, the motion-picture exhibition is not a test but an entertainment. This, it seems to us, is a reasonable view to take in adult-testing.

⁹ As a matter of fact, the present motion-picture tests can measure a somewhat wider range toward the lower end of the scale of intelligence; the Alpha can measure a somewhat wider range toward the upper end.

C. A comparison between the correlation of the motion-picture tests with each subtest of the Alpha, and the average intercorrelation of each subtest of the Alpha with every other subtest of the Alpha.

D. The validity coefficients of three other disguised intelligence tests (Snedden's vocabulary test,⁽¹³⁾ the Conrad-Harris Free Association test,⁽¹⁴⁾ and the Jones-White Practical-Judgment test, Form I¹⁰).

In making the various comparisons mentioned above, two statistical factors must be kept strictly in mind;¹¹ first, the fact that differences in variability affect the magnitude of the coefficient of correlation;⁽⁶⁾ second, the fact that the length of an imperfectly reliable test affects the magnitude of the test's correlation with a criterion. It will be remembered that our motion-picture tests were only 14 and 11 minutes long, respectively; it would, therefore, be manifestly unfair to compare these short tests directly with 30-, 40-, or 50-minute standard intelligence tests. In the comparisons which are to follow we intend, wherever it seems possible and profitable, to employ the statistical technique designed to make uniform and comparable the two statistical factors of variability and test length. It is recognized—and in general need not be repeated—that the assumptions involved in the techniques employed are never perfectly fulfilled; and that the results obtained are merely approximations.

¹⁰ Although not designed or used by the authors to measure intelligence, this test is acceptable to most adults, and might be used as an intelligence test.

¹¹ A third factor will probably occur to the reader, namely, the factor of test unreliability. This factor is usually eliminated by "correcting for attenuation." However, the coefficient thus obtained is a purely hypothetical value which *would* occur if the tests were perfectly reliable. Now, we are interested in the practical, rather than the theoretical, value of our actual tests. No correction for attenuation has therefore been made. We may mention, however, that, since the reliability of the motion-picture tests is somewhat lower than that of the Alpha (and presumably also lower than that of other standard tests), correction for attenuation would serve only to improve the motion-picture tests in the comparisons below.

A1. *Army data on the correlation between the Stanford-Binet and the Army Alpha tests—*

In the army, 653 men were given both the Alpha and the Stanford-Binet tests. These men were an unselected sample of white, English-speaking recruits born in English-speaking countries. The result obtained follows:⁽¹⁵⁾

r , Binet \times Alpha .....	.811
S.D. of Binet test	45.54 months
S.D. of Alpha test	49.40 months

Now, the average S.D. of the Alpha scores of our adult group¹² (aged 17–54) is 43.15¹³ (see tables 4 and 5); whereas the S.D. of the Alpha scores of the Army group is 49.40. Correcting the Army coefficient of .811 for the difference in variability⁽⁶⁾ gives:

r , Binet \times Alpha771
----------------------------------	------

However, this corrected coefficient of .771 is still too complimentary to the Stanford-Binet test, for even a short-scale Stanford examination may be expected to take at the least 25–45 minutes. Assuming the reliability coefficient of the Stanford-Binet test in the Army group to be as high as either .92 or .96⁽¹⁶⁾ and cutting down the Binet test to one-half, one-third, and one-fourth its length, we secure:

	Assuming reliability of Binet test to be .92, the r of .771 becomes	Assuming reliability of Binet test to be .96, the r of .771 becomes
With Binet of $\frac{1}{2}$ length.....	.742	.756
With Binet of $\frac{1}{3}$ length.....	.716	.742
With Binet of $\frac{1}{4}$ length.....	.692	.729

¹² We are using the data on the *adult* group in all of our comparisons, because it is for this group that an *acceptable* test of intelligence (such as a motion-picture test) is most needed. A test especially designed to be acceptable must stand or fall on its ability conveniently and adequately to measure *adult* intelligence.

¹³ This of course is not (nor is it intended to be) the S.D. of the total group of 106 adults aged 17–54—which would have to be computed by formula (5) of Yule, G. U., *Introduction to the Theory of Statistics* (1924), p. 142.

These results are close to the validity coefficients of the motion-picture tests¹⁴ (see table 6).

If, instead of decreasing the Stanford-Binet we were to increase the length of the motion-picture test, the lengthened test would gain only slightly in validity (see p. 262). It seems fairer, however, to cut down the Binet test rather than to enlarge the movie tests, since an adult test of intelligence will have to be a *short* test, or else a battery of short tests administered at different times.

All in all, we may conclude from the evidence above, that the Stanford-Binet, if abbreviated to comparable time limits, *would exceed, but not greatly, the motion-picture tests in validity with adults, if Army Alpha scores are used as the criterion of intelligence.*

A2. *The data of Freeman et al.*⁽¹⁸⁾ *on the correlation between the Stanford-Binet and the International Group Intelligence Test*⁽²⁰⁾—

Freeman, working on a sample of foster children ($n = 297$), secured a correlation of .80 between the Stanford-Binet and the International Group Test. With age partialled out, this dropped to .70. Assuming that the International Test is comparable to the Army Alpha as a criterion of intelligence, it is the latter figure of .70 which should be compared with the average movie validity-coefficient of .68 for our group 17-54, since age is not a significant factor inflating coefficients in our group 17-54. Freeman does not give details as to the variability of the foster

¹⁴ It must be admitted, however, that the statistical technique employed is somewhat favorable to the motion-picture tests; for if the Binet were to be abbreviated, only the best, most valid, and most reliable items would be retained. No doubt there is sufficient difference between the merits of different Binet items to make this factor of importance. The formula last employed⁽¹⁷⁾ assumed that the individual items of the abbreviated test remained the same in validity and reliability as the items of the original test. A further obvious consideration is that, if some other criterion were used, the Binet validity coefficients might be markedly different. The Stanford-Binet appears to correlate consistently lower with standard group-tests than these do with each other (see sections A1, A2, A3, and references 18 and 21). This may support, although inconclusively, the use of the Army Alpha as a criterion of the Stanford-Binet.

children to whom he administered both the Binet and the International tests; but considering the nature of Freeman's sample and the length of the Stanford Binet test, we believe that our conclusion of the preceding section tends to be confirmed.

A3. *Rural Vermont data on the correlation between Stanford-Binet and the Army Alpha tests—*

Jones and Conrad applied both Alpha and Stanford-Binet tests to 42 unselected children between the ages of 10 and 14 (mainly 11 and 13) in the same Vermont districts in which the motion-picture tests were used. The correlation between Binet and Alpha, using sigma scores of each age group for both tests,¹⁴ was .765 \pm .044. This is strikingly close to the Binet-Alpha correlation in the Army sample of adults, after correcting for the difference in variability ($r = .771$). The corrections to the Army r for the greater time consumed by the Stanford Binet test are of course applicable to the Vermont correlation of .765. The Vermont data and the Freeman data confirm the results from the Army, and our conclusion thus far must be that the Stanford Binet test, if abbreviated to equal time limits, *would surpass, but only slightly, the motion-picture tests in validity with adults, if the Army Alpha or the International test is used as a criterion of intelligence.*

B. *The correlation of each subtest of the Alpha with the sum of the other subtests of the Alpha—*

As a further step in analysis, it is possible to compare the motion-picture validity coefficients with the validity coefficients of the individual subtests of the Alpha.¹⁵ This will enable us to estimate the validity of the content of motion-picture tests, in comparison with that of the constituent tests of a standard group-intelligence examination.

As the basic validity coefficient of each individual subtest of the Alpha, we shall use the correlation existing between this

¹⁴ Reference (15), table 155, p. 634.

individual subtest, and the sum of the seven other subtests of the Alpha. This correlation, however, is not quite comparable to the average validity coefficient of the motion-picture tests in the group aged 17-54; because, with the latter, the validity coefficient is the correlation between the motion-picture test and the sum of the *eight* subtests of the Alpha—not merely seven. Furthermore, our average motion-picture test consumes 12.5 minutes (test A, 11 minutes, test B, 14 minutes), whereas no subtest of the Alpha requires more than 5 minutes of working time; for purposes of comparison, therefore, either the motion-picture test must be *shortened*, or the individual subtests of the Alpha *lengthened*. Finally, the average standard deviation of the two adult movie-groups taking the Alpha is not the same as the standard deviation of the Army group.

Making the necessary statistical corrections for all of these factors, we secure the following two tables: the first, on the basis of lengthening the individual Alpha subtests, the second on the basis of shortening the time of the average motion-picture test.

TABLE 11

VALIDITY COEFFICIENTS OF THE INDIVIDUAL SUBTESTS OF THE ARMY ALPHA,
ON THE BASIS OF LENGTHENING EACH SUBTEST TO 12.5 MINUTES

	Validity- coefficient of Alpha subtest
Subtest 1.....	.683
Subtest 2.....	.832
Subtest 3.....	.840
Subtest 4.....	.915
Subtest 5.....	.918
Subtest 6.....	.829
Subtest 7.....	.850
Subtest 8.....	.859
Average.....	.841

Since the comparable average validity coefficient of tests A and B in the adult group is .68, it is clear that with the excep-

tion of the Directions Test (subtest 1), the Army Alpha subtests exceed our average motion-picture test in validity (by the criterion employed). It is, however, likely that the lengthening of any single Alpha subtest, to the degree represented in the table above, would result in much more serious cooperation difficulties than are now encountered. While ten or fifteen minutes is not too long for an interesting memory test on a motion picture, it would certainly be too long for such tests as the disarranged sentences or the number-series completion in the Alpha. Hence, the application of formula 3 of reference (17) probably operates to expand the coefficients in table 11 beyond their proper value.

TABLE 12
VALIDITY COEFFICIENTS OF THE AVERAGE MOTION-PICTURE TEST, ON THE
BASIS OF SHORTENED TIME*

If the average motion-picture time were shortened to the time of Alpha subtest number	The motion-picture validity coefficient would become:	The comparable validity coefficient of each Alpha subtest is:
1.....	.649	.654
2.....	.649	.797
3.....	.559	.788
4.....	.559	.859
5.....	.587	.857
6.....	.619	.780
7.....	.619	.799
8.....	.637	.813
Average.....	.610	.793

* It may occur to the reader that the statistical reduction of our motion-picture tests to, let us say, the time of Alpha subtest 4 (14 minutes) is a highly artificial procedure; since, with such a time limit, the nature of our present tests might be completely changed. In truth, however, the figures presented in this table do not really aim to state the validity of a shortened motion-picture test; rather, they aim to state the comparative validity of a motion-picture test *per unit of time* consumed by the total motion-picture test. In order to state this comparative validity, a statistical equating of test times is, so far as we know, the only technique possible.

The conclusions to be drawn from the table above are corroborative of those derived from table 11. By the criterion of the total Alpha, the content of the motion-picture tests is as valid as that of the Directions Test, but less valid than that of the other constituent tests of the Alpha.

C. A comparison between the correlation of the motion-picture tests with each subtest of the Alpha, and the average intercorrelation of each subtest of the Alpha with every other subtest of the Alpha—

We have so far been considering the motion-picture tests as competitors of standard tests, or as competitors of the subtests of a standard test. We wish now to consider the possible utility of a motion-picture test, not as a competitor, but as a member of a team of tests. The requirements of the subtests of a team are (a) a high correlation with the criterion, and (b) a low intercorrelation between the subtests. The matter of correlation with the criterion (i.e., validity), we have already considered in some detail. The matter of intercorrelation remains to be discussed. As before, corrections of the basic data for inequalities in time and variability are necessary. Making these corrections we secure the results which are summarized in table 13, together

TABLE 13

INTER- r 's AND VALIDITY- r 's OF ALPHA SUBTESTS vs. MOTION-PICTURE TEST*

Subtest No.	On the basis of lengthened Alpha subtests, and full-time motion-picture test (12.5 minutes)				On the basis of shortened motion-picture test, and standard time Alpha subtests			
	Alpha		Motion-picture test		Alpha		Motion-picture test	
	Average inter- r	Validity- r	Average inter- r	Average validity- r	Average inter- r	Validity- r	Average inter- r	Average validity- r
1	.589	.683	.57	.68	.504	.654	.536	.649
2	.738	.832	.56	.68	.708	.797	.537	.649
3	.707	.840	.56	.68	.694	.788	.463	.559
4	.769	.915	.56	.68	.722	.859	.463	.559
5	.809	.918	.58	.68	.755	.857	.484	.587
6	.723	.829	.57	.68	.680	.780	.511	.619
7	.767	.850	.55	.68	.721	.799	.514	.619
8	.727	.859	.55	.68	.689	.813	.529	.637
Average	.729	.841	.563	.68	.688	.793	.505	.610

* Space is not available for presenting in detail the derivation of these coefficients. The full procedure is on file at the Department of Psychology of the University of California.

with the validity coefficients which are brought forward from tables 6, 11, and 12. On inspection of table 13, it is clear that the correlation of the average motion-picture test with the Alpha subtests is lower than the intercorrelations of these subtests. In this respect, a motion-picture test would make a good member of a team composed of tests similar to the Alpha subtests. On the ground, both of intercorrelations and validity coefficients, there could be no statistical objection to including a motion-picture test in an intelligence battery, or in substituting it for such a test as the Directions test of the Army Alpha. Such a substitution would be justifiable in community-testing, even without the formal statistical equality here indicated; the high acceptability of the motion-picture tests, the motivation and rapport which a motion-picture can supply, and the fairness of sampling which this technique obtains,⁽¹⁾ should all be considered as factors of the utmost importance.

D. The validity coefficients of three other disguised intelligence tests—

It would be fairer to compare the motion-picture test with other tests having some of its peculiar virtues; viz., acceptability, group administration, sampling facility, and short working time.

1. Snedden,⁽¹³⁾ using an approximately nine-minute concealed vocabulary test, secured a coefficient of correlation between his test and the Army Alpha of .82. Apparently age is not a factor inflating this coefficient. Snedden's sample consisted of 113 selected school and high school children (mean age, 13 years 7 months; S.D. of age distribution, 13.8 months); the mean of the children in the Alpha was 84.6; the S.D. was 38.7. Snedden's test suffers from the fact that it is not susceptible to group administration; this would undoubtedly create serious administrative difficulties (not to mention mere expense) in the testing of families.

2. More recently, Conrad and Harris have worked with a free-association test.⁽¹⁴⁾ This was administered to a group of 166 sixth to eighth grade pupils who took about 12.5 minutes to finish the test. National Intelligence Test scores (form A) were used as a criterion of intelligence (mean 128, S.D. 19.6). The coefficient of correlation between Free Association Test scores and N.I.T. scores was .775 (with age partialled out the correlation is .780). This is higher than the average movie validity coefficient for adults (viz., .68), and would of course be considerably higher yet, if a correction is made for the difference between the variability of the sixth-eighth grade group and the variability of the rural group aged 17-54. In terms of mental age, the S.D. of the sixth-eighth grade pupils is 20.22 months; that of the adult group is 34.85 months.⁽¹⁹⁾ Correcting the coefficient .775 for the difference in variability, we secure as the theoretically comparable validity-coefficient of the Free Association test, the figure .90.

Whether similar results would be obtained if the Snedden vocabulary test or the Conrad-Harris Free-Association test were administered to *adults* instead of school children remains, as yet, an open question; but we see no reason to expect any very large drop in validity.

Our conclusion from the two studies just reported must be that a concealed vocabulary test or an association test similar to the one here reported, is undoubtedly superior in statistical validity to the motion-picture tests, at least in the case of children. *It must be remembered, however, that the motion-picture tests are probably susceptible to much improvement,*⁽¹⁾ while the same is probably not equally true of the other two disguised intelligence tests. Moreover, the motion-picture tests probably hold the advantage in acceptability, and in the facility with which they enable the collection of fair community samples.

3. More recently still, Jones and White, at the Institute of Child Welfare, University of California, have evolved a Test of Practical Judgment on problems in child welfare. This test

was not designed to be a general adult intelligence test, and is not used as such by the authors. However, the Practical Judgment test would be quite acceptable to such adults as have children, or are interested in children. Jones and White¹⁸ report a correlation between Practical Judgment and Army Alpha, of .57. This correlation was obtained in a sample of 200 graduate and undergraduate practice-teachers at the University of California. The standard deviation of this group in the Alpha is 18.40; the average S.D. of our adult movie-group is 43.15. Correcting the coefficient of .57 for the difference in variability between our adult group and the California practice-teachers, we obtain a theoretical validity coefficient of .85 for the Test of Practical Judgment.

GENERAL CONCLUSIONS

It is only by the use of acceptable tests that a fair, unselected sample of adults can be obtained. This unselected adult group—of the greatest interest to the sociologist and the social psychologist—has so far been the least amenable to ordinary methods of sampling and testing. The motion-picture technique can remove this deficiency.

A ten- or fifteen-minute motion-picture questionnaire, based on a commercial or popular-educational film, may be used with success upon adult subjects who have passed the third or fourth grade of elementary school. The reliability of such a motion-picture questionnaire has been proved to be high (.92-.95). The problem remaining, from the point of view of the intelligence tester, is to increase the validity of the motion-picture test; and from the point of view of the audience, still further to increase the ease and agreeableness with which the test can be undertaken and completed.

¹⁸ Unpublished data.

As intelligence tests, the motion-picture questionnaires have yielded results which are more than merely encouraging. The present writers' questionnaires are based on two somewhat ordinary commercial motion pictures; the individual questions were not designed specifically to measure intelligence; and the whole procedure was undertaken in the absence of any experimental background. In spite of these limitations, correlations in the neighborhood of those attained by certain standard tests have been secured. The motion-picture test, even in its present form, may be relied upon as an adequate measure of adult *group-intelligence*; and it may be expected that later versions will be sufficiently valid for measuring the intelligence of the unselected adult *individual*.

LITERATURE CITED

- ¹ CONRAD, H. S., and JONES, H. E.
1929. "Psychological Studies of Motion Pictures: IV. The Technique of Mental Test Surveys among Adults." *Univ. Calif. Publ. Psychol.*, 3:277-284.
- ² JONES, H. E., CONRAD, H. S., and HORN, A.
1928. "Psychological Studies of Motion Pictures: II. Observation and Recall as a Function of Age." *Univ. Calif. Publ. Psychol.*, 3:225-243.
- ³ JONES, H. E.
1928. "A First Study of Parent-Child Resemblance in Intelligence." *Twenty-seventh Yearbook of the National Society for the Study of Education*, 1:61-72.
- ⁴ THORNDIKE, E. L.
1926. *The Measurement of Intelligence* (Teachers College, Columbia University), 7.
- ⁵ KELLEY, T. L.
Statistical Method.
- ⁶ *Ibid.*, 225.
- ⁷ HSAIO, H. H.
1927. *Performance on the Army Alpha as a Function of Age*. M.A. Thesis, Columbia University. Also reference 2 above.
- ⁸ GARRETT, H. E.
Statistics in Psychology and Education, 269.
- ⁹ *Ibid.*, 274.
- ¹⁰ *Ibid.*, 271.
- ¹¹ HORN, A.
1927. *The Influence of Age upon Movie Scores in a Rural Community*. M.A. Thesis, Columbia University.
- ¹² BURKS, B. S.
1926. "On the Inadequacy of the Partial and Multiple Correlation Technique." *Jour. Ed. Psychol.*, 17:532-540.
- ¹³ SNEDDEN, D. S.
1927. *A Study in Disguised Intelligence Tests* (Teachers College, Columbia University).

¹⁴ HARRIS, D.

1928. *Association Reaction and Intelligence*. M.A. Thesis, Columbia University.

¹⁵ *Memoirs of the National Academy of Sciences*, 15:563-564.

¹⁶ BURKS, B. S.

1928. "The Relative Influence of Nature and Nurture upon Mental Development: A Comparative Study of Foster Parent-Foster Child Resemblance and True Parent-True Child Resemblance." *Twenty-seventh Yearbook of the National Society for the Study of Education*, 1:283.

¹⁷ BINGHAM, W., and FREYD, M.

1926. *Procedures in Employment Psychology* (A. W. Shaw and Co., Chicago), 168.

¹⁸ FREEMAN, F. N., et al.

1928. "The Influence of Environment on the Intelligence, School Achievement, and Conduct of Foster Children." *Twenty-seventh Yearbook of the National Society for the Study of Education*, 1:110.

¹⁹ CONRAD, H. S., and HARRIS, D.

"The Free Association Method and the Measurement of Intelligence." Unpublished.

²⁰ DODD, STUART C.

1926. *International Group Mental Tests* (Princeton University).

²¹ FRANZEN, R.

1922. "Attempts at Test Validation." *Jour. Ed. Res.*, 6:145-158.

PSYCHOLOGICAL STUDIES OF MOTION PICTURES

IV. THE TECHNIQUE OF MENTAL-TEST SURVEYS AMONG ADULTS

BY

HERBERT S. CONRAD AND HAROLD ELLIS JONES

The preceding article in this series gave the specific results of a survey which employed, in a tentative and experimental form, a battery of tests based upon motion pictures. The present report will attempt to summarize certain general suggestions pertinent to further work in this field.

A practical method of securing fair samples of rural communities would offer important research possibilities to the sociologist, the social psychologist, and the mental tester. The motion-picture audience method⁽¹⁾ is practical. We know of no other technique which will yield an equally good sampling of adults with similar certainty, or comparable cost. Since this motion-picture technique promises to have applications in a wide range of studies on rural problems, it may be worth while to summarize certain conclusions from the writers' survey experience.

A. THE MANAGEMENT OF A TEST PROGRAM IN RURAL COMMUNITIES.

1. *Community relations*—

The success of any psychological or sociological community survey or investigation depends to a large extent upon the ingenuity of the investigators in meeting objections, and in presenting their enterprise in its most favorable light. The most elaborate technique will fail unless the investigators are on a personally friendly footing with the local inhabitants. The first aim is to establish community rapport, by any means that appear to be sound, and thereafter to conduct the schedule of research in such a manner as to give a minimum of strain to the good will which has been obtained. It was the experience of the writers that free entertainments, with properly chosen motion pictures, greatly simplify the task of maintaining a friendly entente.

2. *Advertising*—

If a representative sample is desired, it is necessary to manage publicity so that the test program receives the *favorable* consideration of all groups. After personal contact has been made with the leading professional and business men in the town, the test program should be explained to them, and their approval solicited. While endorsement may be difficult to obtain purely on the basis of research, it is possible to utilize personal and community pride and similar motives in gaining active support. Announcements may be given out in church and at meetings of the Grange and other local societies; in addition, the usual advertising methods of the local motion-picture exhibitor should be followed, with newspaper notices, and placards posted up in the village and along country roads. If the exhibition is given free or at reduced rates, this serves to secure a wider sample from the lower economic groups (without any necessary sacrifice of attendance from the other end of the scale); cooperation in the survey also creates a general sense of obligation, if the tests are not too arduous nor too abruptly presented.

3. *Place of meeting*—

The community group should be convened in the regular motion-picture hall, with the same projection and the same musical accompaniment to which the audience is accustomed on other nights.

4. *Size of the audience*—

The size of the audience which an investigator can adequately handle will depend, of course, on the skill and experience of the investigator, the competence of his assistants, and the cooperation of the audience. Ordinarily, with good cooperation and trained assistants, an investigator should not attempt to assemble a group larger than 200. In the larger villages, where the expected attendance is greater than the capacity of the hall,

more than one show may be given, with admission by a non-transferrable family card of invitation; the cards are mailed out to families which are selected by economic and social criteria as being representative of the total community.

5. *Screen program—*

An interesting comedy should constitute the first part of the program. This serves to keep the audience occupied and in good humor, while it permits stragglers to come in before the actual testing is begun.

If the test is to be based on a motion picture, the test picture should ordinarily be of a lively and interesting nature, with an appeal which extends throughout the age range to be tested.

It should be announced that, following the questionnaire, the program will be continued with one or two popular reels. This serves the double purpose of holding practically the whole attendance until the end of the program, and also of sending the patrons home well satisfied.

6. *The test procedure—*

At the end of the test picture, a brief announcement is made on the screen concerning the next part of the evening's program. Immediately after this the lights are turned on, and the investigator is introduced to the audience by a town official, a local minister, or some other person carrying a suitable degree of neighborhood prestige. While the experimenter is giving a brief explanation, a staff of assistants, each trained in his specific task, is passing out lapboards, pencils, and printed questionnaires or test blanks; with a little preparation, this can be done very rapidly. The outer cover of the test booklet contains a number of "blind" items, or routine questions concerning the age, occupation, etc., of the subject. These are designed to hold the attention of the audience and to keep them from turning to a later page; they are specifically requested to read the first page only, and the monitors must see that this condition is fulfilled. The experimenter emphasizes the statement that he is interested in the *average* rather than individual results—an announcement which can be so managed as to appeal to town pride, without arousing a disturbing degree of inferiority reactions. If possible, some more or less scientific reason is stated for giving the test (e.g., "We want to determine what a typical [or superior] audience notices and prefers in the moving pictures"). It is emphasized that this is a *questionnaire* (the word *test* never being mentioned); the questions are described as short, easy, and interesting, but the group is urged to work rapidly and carefully in order to finish within a limited time. All necessary instructions should be in print, readily available for any person in the audience. The instructions should be very simply worded. At a signal the subjects turn to the second page, look at the directions while the investigator reads them out loud, and then begin the test. Monitors are posted wherever necessary to maintain quiet and encourage persistent work.

After a certain time (see 9 below) the audience is requested to turn promptly to the bottom of the last page of the test, and to fill out the information there requested. This information may be full, or it may amount merely to a request for the subject's signature. In any audience some will usually refuse to sign their name. To minimize this, the investigator should emphasize that, while his interest is in the average results, he must know who are answering the questionnaire in order that the nature of the sample may be properly evaluated. As evidence of his good faith, the investigator promises that the names (and other personal data, if any) will be torn off from each questionnaire. With a cooperative audience, this is usually sufficient. With an uncooperative audience, the investigator may invite the audience to tear off their signatures themselves. The torn-off signatures can be later allocated to their appropriate papers by the handwriting, or by fitting together the torn edges. With a large group, identification may be provided by some such device as the following: The signatures are written in rectangles which are rubber stamped on the test paper, with a vertical arrow pointing toward the rectangle. In stamping, the arrow falls across a perforated line, in a slightly different position for each test paper. When the signature is torn off, it may be readily fitted back by joining the two ends of the arrow.

Subterfuges of this nature need not ordinarily be used, and can be avoided if sufficient time and pains are taken to acquaint the audience with the nature of the investigation. The best guaranty of continued cooperation lies in keeping all relationships entirely open and above board.

The only possible justification for subterfuges lies in the fact that no *personal* use ever will be made of the records. The only motive for a subject's withholding his name is his desire not to have his score known. This desire must, of course, be strictly respected; the identification, when obtained by either direct or devious methods, is employed solely for statistical purposes of correlation and of classification of the sample.

If the experimenter contemplates giving a second test, he should be careful to humor his audience during the first test. Insistence upon minutiae is never advisable. It is obviously better to lose a few individual tests than to lose the faith and cooperation of an entire community.

7. Organization of the test—

The test should be arranged in a spiral form, the first questions being exceptionally interesting and easy, with a recurrence of easy questions at successive later points. In adult testing, the desirability of such a plan is obvious. Decoy and "blind" items may be employed, if necessary; their purpose being to supply interest value, without any later use in the scoring. The interest value of a schedule can be greatly increased by the use of half-tone illustrations which may also serve in connection with test items; in the case of motion-picture tests, "stills" from the screen production would be useful for this purpose.

It need hardly be mentioned that the printing and format of the test should be exceptionally legible, pleasing, and convenient to the audience.

8. *Elimination of copying—*

With tests which are suitably organized and administered, very few persons will have either the time or the inclination to copy. As safeguards, the writers have made use of alternate forms of all tests. In the case of the motion-picture tests, it was found convenient to construct two forms containing the same questions (unnumbered), in different orders; persons sitting in adjacent seats received different forms.

9. *Time limits—*

The test should ordinarily be stopped after about 5 to 10 per cent have finished. A trial on a preliminary group will indicate the optimum time. In calling time, it is usually best to make this appear informal rather than arbitrary. The audience is comforted with the impression that they are stopped not because they have used up an allotted period, but because they have progressed far enough to fulfil the purposes of the survey. At the same time, this provides certain individuals with a satisfying rationalization for a poor performance; viz., that they were halted before they could show their full ability.

Even if speed is not an important factor contributing to the reliability and validity of the test, it is probably administratively undesirable to give a time allowance so long that over 10 to 15 per cent of the group are able to finish; since restlessness among those who have finished, and inferiority feelings among those who have failed to finish, are likely to become disturbing factors.

B. SUGGESTIONS FOR INCREASING THE EFFICIENCY OF MOTION-PICTURE TESTS IN THE MEASUREMENT OF INTELLIGENCE

1. The efficiency and usefulness of a test is a function of its *acceptability*. Too often this factor is neglected, although it should be sufficiently obvious that anything which promotes interest in a test, promotes also the ease and uniformity of administration, and its eventual validity.

2. The directions for the test should be simple and well illustrated. They should be so planned as to give a clear (or apparently clear) conception of the task; confusing elements should be eliminated, and the general effect should be to invite the interest of the subjects and to encourage an attitude of cooperation.

3. Questions should be mainly of moderate difficulty; although to measure the full range of intelligence a certain number of hard and of easy questions must of course be included. In the construction of questions, some preference should be given to the essential, captional content of the motion picture, rather than the incidental, pictorial content.¹

¹ Most of the recommendations in this section are based on data obtained from an objective weighting of each item in the motion-picture tests.

It does not seem wise at present to limit a test to the strictly objective type of question. In the time and ingenuity required for their construction, and the time and cost involved in their printing, the ordinary multiple-choice question is at a definite disadvantage to the completion question. The objective-type question may require less time for answering; but this is doubtful. The one certain advantage of the multiple-choice over the completion question is the increased ease and objectivity in scoring; this advantage, however, has in the writers' experience not been great enough to give the multiple-choice questions any higher average weight than the completion questions. The advantage of multiple-choice questions is probably discounted, with adult groups, by their unfamiliar nature, and by the necessity for an increased amount of incidental reading. Completion questions can be so planned that the answers will be brief, and narrowly prescribed; the questions can be printed so that the correct answer will always fall at the end of a line. Such completion questions can be marked rapidly and with a high degree of objectivity.

For survey purposes it is suggested that a new type of multiple-choice questions be tried out; namely, one in which more than one of the choices is correct. In such an item, a fully correct answer would require the indication by the subject of all the correct choices. The special value of this type of question would be that an inferior individual might feel satisfied after recognizing and indicating only *one* of the correct choices. It enables us, in other words, to have questions of concealed difficulty, which are, of course, less annoying (especially to an adult subject) than frankly difficult questions.

Occasionally a question may occur which is so constructed that it requires exceptional language ability for its comprehension. Such questions, amounting virtually to a test of vocabulary, are probably unpopular with average adults, and should be employed sparingly.

4. For suggestions concerning the elimination of copying, see A, 8, page 281.

5. With reference to the timing of the test, no advantage appears to be gained by a very limited time allowance. Test B was closely similar to test A except in the number of items which the subjects did not have time to attempt. Speed was of some importance in test A (only about 20-25 per cent finished the test), but it was much more important in test B (not more than 5 per cent finished the test). Test B yielded about the same validity coefficients as test A, and slightly lower reliability coefficients.

For other suggestions concerning timing, see A, 9, page 281.

6. There are some tentative indications that a delayed test (after a week or less) may have a greater validity than one given immediately at the end of the test picture.

7. The scoring of questions should be according to a written standard prepared by at least two competent psychologists after an adequate samp-

ling and listing of responses. If the questions are not all of the objective type, it is essential that the scorer should be able to apply intelligently the written standard.

8. Weighting of individual items is not advised, other than the use of half-credits for certain types of answers, and the assignment of reduced or zero credit for the extremely easy questions which have been included merely to improve the acceptability of the test. Unless a weighting system is extremely valid, and the range of question value great, a rough subjective weighting is likely to be as satisfactory as a weighting by more precise objective methods.

9. The effect upon validity of increasing the speed of projection of a film, or of an imperfect focal adjustment resulting in a blurred picture, etc., remains to be investigated. From certain preliminary results, it appears likely to the writers that such imperfections,² if well within the patience of the audience, and if limited to certain portions of a picture, would be of some advantage in placing an increased premium upon attention and alertness.

10. The ideal motion-picture intelligence-testing technique would require a photoplay *made especially for intelligence-testing purposes*. Such a picture would combine action and popular interest with intellectual provender and subtleties—each part of the audience to choose and enjoy the elements which meet its interests. A few of the captions of such a picture might be designed to serve as vocabulary tests. The possibilities inherent in this method are, we believe, greater than may appear offhand. A specially constructed photoplay might measure intelligence as well as our best reading-tests now do.²

² It is important that any imperfections should be uniform throughout the various parts of the audience, i.e., equally (or nearly equally) disadvantageous to the person in front as to the person in back. With small rural audiences, such equality would probably be easy to arrange.

LITERATURE CITED

¹ CONRAD, H. S., and JONES, H. E.

1929. "Psychological Studies of Motion Pictures: III. Fidelity of Report as a Measure of Intelligence." *Univ. Calif. Publ. Psychol.*, 3:245-276.

² FRANZEN, R.

1922. "Attempts at Test Validation." *Jour. Ed. Res.*, 6:145-158.

INDEX

- Acknowledgments, 74, 226, 246.
- Addams, George S., Judge of Juvenile Court, Cleveland, cited, 53.
- Adoption: tendency to demand clean bill of mental and physical health before being placed for, 32.
- Affection: literature on, 78; expression of, 88; in idiots, imbeciles, morons, 123, borderlines, 124, and treatment of, 111; frequency of manifestation, 112-113, 118; duration of, 114, 118; intensity of, 115-118; intercorrelations of aspects of, 118; score distribution, 118, 119, 120; prediction indices for, 121; correlation of, with I.Q., mental age, actual age, 121; object of, 122; conclusions regarding, 139.
- Affective psychology of mental defectives, 75.
- Age, correlation of actual, with anger, 104, with affection, 121, with fear, 124; distribution of, 127;
 and mental age: at time delinquency begins, 161; guidance necessary, 161; improvement and change in, 162-163; rate of improvement, 164; school grade and, 176, records, 177.
- Age curves, characteristics of, 233, 243; 255 ff.; comparison of, 237.
- Age distribution, 240; correlation of Alpha score with, 259; range, 279.
- Age groups, 243; differences, 242, 243.
- Agencies, list of, sending children for mental examination, 7, 31.
- Americanization of children before parents' Americanization, result of, 263.
- Analysis of Package Labels, 61-72.**
- Anger: literature on, 77; expressions of, 86, 109, 110; questionnaire on, 90; treatment of, 92; scoring, 93, 99, 101, 102, 104; frequency of, 94-96, 99; duration of, 96-97, 99; intensity of, 98-99; intercorrelations of three aspects of, 102; correlations of, with I.Q., mental age, actual age, 104; prediction indices for, 106; causes of, in idiots, 107, 109; in imbeciles, morons, border lines, 108, 109; unfocused, 111; conclusions regarding, 138.
- Behavior, defined, 84; cause, duration, relative frequency and intensity of, 86.
- Binet, A., quoted, on drawing from memory, 167.
- Binet scale, measurement of intelligence, 14 ff.; basis for diagnosis of: delinquent children, 16, dependent children, 35, miscellaneous cases, 47; limitations to use of, 17; modification by H. H. Goddard, 18, 53; children graded as normal by, 47, 52, 53.
- "Borderlines," cause of anger in, 108, 109; expression of anger, 109, 110, affection, 124.

Index

- Bridgman, Olga, **An Experimental Study of Abnormal Children, with Special Reference to the Problems of Dependency and Delinquency**, 1-59.
- Chicago, Juvenile Psychopathic Clinic, 52; Morals Court, 51.
- Chronological age: delinquent children, 9; dependent children, 32; miscellaneous group, 48.
- Conrad Harris Free Association test, 264, 272.
- Conrad, H. S., and Jones, H. E., **Psychological Studies of Motion Pictures: III. Fidelity of Report as a Measure of Adult Intelligence**, 245-276; **IV. The Technique of Mental Test Surveys among Adults**, 277-284.
- Cornell University, Educational Department, tests made by, 53.
- Correlation, formula for computing, 103, 137, partial, 136; formula to eliminate influence of age, 254; between age and motion picture test scores, 258; of Alpha score with age, 259; between two motion-picture tests and intelligence, 262-263.
- Court appearance, first, for delinquency, type of offense, 158.
- Crimes, etiology of, defective intelligence vital mental factor in, 156.
- Defective delinquent girl: aim of investigation, 148; number of cases studied, 148; length of time of observation, 148; follow up reports, 200 ff.
- Defective girl: lack of interests more dominant than presence of vicious ones, 167 ff., 202; recreational interests, 173, 206; emotional activity, 173, 174, 203; physical status, 174-175, 203; types of work done by, 178, 179, 181; wages received, 179-180; irregular periods of employment, 180; nativity, 180-183, of parents, 184-186; non-delinquent, 205. *See also* Defective delinquent girl; Heredity; Mental deficiency.
- Deficiency, mental, cause of delinquency, 156, 157.
- Delinquent children: Juvenile Court cases, 7; offenses, 7, 8; ages of, 9 ff.; classification of, 16; effect of unfavorable environment upon, 16, 17; employments of, 18; occupations of, 19; problem of training, 19; study of type of parents of, 20, 22, 23, 24, their conditions, occupations and nationality of, 21-29; large proportion defective, 54.
- Delinquent defective, segregation, 206; sterilization, 207.
- Delinquent girls: prostitution among, 159, 162, 191, 203, 210, 211; probation, 195, 196, 198; placement, 206.
- Delinquency: legally recognized, 148; no distinction made by California Juvenile Court between dependency and, 149; defined, 149; among girls, 149, 154, 155, 156; biological, 155; first court appearance, type of offense, 158; case histories, 208 ff.
- Dependency and delinquency defined, 5-6.

Index

- Dependent children: nativity of, 24; from public agencies, 31, 32; averages of, 32 ff.; later also become delinquent, 33; comparison of, 33 ff.; social problem of, 39; study of type of parents of, 39, 40, 41, their conditions, occupations and nationality, 41-44; study of, 54.
- Doll, E. A., quoted on feeble-mindedness, 168.
- Duration defined, 93.
- Emotions: major, expression of, 73; literature on, 77; of mental defective, literature on, 74, 79; of feeble-minded, 75; sex, 78, 124; intensity of, 83; final score for, 101; intercorrelations, 136; earliest development, 137.
- Environment: of child in home, institution, foster home, 3, 4, 20, 29, 30; effect of, on child, 4; classification as to type of, 4; effect on normal children of unfavorable, 16, 17; early training and, of delinquents, 29-30, of dependents, 44-45; of defective delinquent girl, 118; of defectively endowed children, 156; defectives dominated by, 157; home conditions and, 186-192, 200, 204, 205; control of, 206. *See also* Heredity.
- Fear, literature on, 78; expressions of, 87, 125; questionnaire on, 90; causes of, 136; subjects for experiment on, 127; reactions, 129; score distribution on, 134; correlations of, with I.Q., 134; conclusions regarding, 139.
- Feeble-minded, psychology of, 73.
- Feeble-mindedness, 118, 152, 155, 157, 168, 193, 199, 204.
- Feeble-mindedness among: delinquents, 16, 50; dependents, 35, 50; miscellaneous cases, 47, 49; inmates of almshouses, 50; prostitutes, 50, 51, in Ohio Girls' Industrial School, 52-53.
- Follow up reports after release by Court, 200 ff.
- Frequency defined, 93.
- George Junior Republic, Freeville, N. Y., problem of mental deficiency in, 51, administration of, 54.
- Goddard, H. H., cited, 15, 50; Binet scale as modified by, 18, 53; his 1911 Revision test used, 149, 153, 165.
- Goring, C., quoted on defective intelligence, 156.
- Group response to individual tests, 164 ff.; lack of interest rather than presence of vicious ones, 169 ff.; recreational interests, 172; emotional characteristics, 173 ff.
- Hatred, 144, 138, and revenge questionnaire on, 91.
- Healy, W., cited, 57.
- Hereditary equipment, importance of, 157.
- Heredity and environment, 30; defective, 157; vicious cumulative sequence of defective, in parent and offspring, 30a. *See also* Environment.
- Hickman, H. H., cited, 53.
- Hobapple, F. L., quoted on standards of behavior, 150.

Index

- Huey, E. B., cited, 15.
- Idiots, anger in, 107; expression of anger by, 109, of affection, 123.
- Imbeciles, anger in, expression of anger by, 109, 110, of affection, 123.
- Inheritance, feeble-mindedness and, 155.
- I. Q. *See* Intelligence Quotient.
- Institutional care and commitment of delinquent girls, 192-193, 196-198, 200, 206; reformatory type, 204.
- Intelligence: measurement of, by Binet scale, 14 ff.; in defective persons, 14-15, 156; in morons, 15; in etiology of crime, 156; curves of growth and decline, 243; Army Alpha test, 259; comparison of, tests, 263, 265, 266, 267. *See also* Tests.
- Intelligence, curves showing growth and decline, 243.
- Intelligence Quotient, determination of, 81; distribution of, 82, 127; correlation of with anger, 104, with affection, 121, with fear, 134.
- Intensity defined, 93. *See also* Affection, Anger, Behavior.
- Jealousy, 111, 138; questionnaire on, 91.
- Jones, E. H., *et al.*, **Psychological Studies of Motion Pictures. II. Observation and Recall as a Function of Age**, 225-243.
- Jones, H. E., and Conrad, H. S., **Psychological Studies of Motion Pictures. III. Fidelity of Report as a Measure of Adult Intelligence**, 245-276; **IV. The Technique of Mental-Test Surveys among Adults**, 277-284.
- Jones-White, Practical-Judgment test, 264, 272, 273.
- Juvenile Court of San Francisco, 7; delinquency records, 34.
- Lapage, C. P., cited, 150.
- Literature on emotions of mental defectives, 74, 77; anger, 77; affection, fear, 78; on major emotions in mental defects, 141-142.
- McCall's T Method, results determined by, 230, 231.
- Massachusetts "Commission for Investigation of White Slave Traffic, So-called," report of, quoted, 50.
- Memory, visual. *See* Visual memory.
- Mental age of delinquent children, 9; dependent, 33; girls more backward than boys, 33; of miscellaneous group, 48.
- Mental ages, distribution, 80, 82, 127; determination of, 81; correlation of, with anger, 104; affection, 121, fear, 134; scattering and, relation between, 168.
- Mental defect largest single cause of delinquency, 52, 53, 54.
- Mental deficiency: among juvenile delinquents, 148; defined in British Act of 1913, 150; described and defined, 151-153; more frequent among women and girls than men and boys, 154; early detection of, 205; follow-up procedure after detection, 206.
- Mentally defective, affective psychology of, 75; percentages of, in various groups, 160.
- Method of absolute judgment of pitch, 215.
- Morons, anger in, 108, 109, 110; affection in, 123.

Index

- Morrison, Beulah M., *A Study of the Major Emotions in Persons of Defective Intelligence*, 73-145.
- Motion-picture audiences: phases of intelligence of, 248; occupational distribution of, and sampling obtained from, 248-249; adolescents rather than adults, 250.
- Motion-picture tests: subject matter (films used), 226; comprehension and memory in, 227; readiness to cooperate the only selective factor, 227, 228, 235; questionnaire, 227, 247, 279; how conducted and results obtained, 228, 274; score of participants, 229; reliability as measure of visual memory, 234; types of, 246; possible substitute for other standard intelligence tests, 247; accuracy and speed important, 247; Army Alpha test given with, 248; occupational distribution of, sampling obtained from, 248-249; with other intelligence tests, 263; reliable for adult intelligence measure, 274; method of sampling practical, 277; efficiency, 281 ff.; type and range of questions, 281-282; scoring, 282-283.
- Motion pictures, technique in psychological laboratory experiments, 225, in ideal intelligence-testing, 283.
- Nativity of delinquent and dependent children compared, 24.
- "Neglected child," term introduced into juvenile court law, 5.
- Non-delinquent defectives, study of, as help for understanding of delinquents, 205.
- Non-sexual irregularities, 159.
- Otis, Margaret, cited, 52.
- Parent and offspring. *See* Defective heredity.
- P. E., formula for computing the, 103.
- Prediction indices, for anger, formula for computing, 106; for affection, 121.
- Probation, delinquent girls and, 195, 196, 198.
- Psychology of the feeble-minded, 75.
- Pyle, W. H., conclusions of, on mentality, 51-52.
- Questionary on: anger, fear, 90; affection, hatred and revenge, jealousy, 91.
- Reactions defined, 84; types of, 85; of fear, 129; to rat stimulus, 132.
- Relief: measures, inadequacy of, 19; short-sightedness of, 20; methods of; enumerated, 205 ff.
- Renz, Emile, cited, 52.
- Reliability: and stability of tests, 251; of Army Alpha intelligence test, 259; of motion-picture tests, 259; coefficients and related data, 260-261; and validity, effect upon, of increasing length of motion-picture tests, 261.
- Retardation, scholastic, 203.
- Revenge, 111.
- Scale for scoring and grading of: anger, 94, 96, 98; affection, 112, 115.
- Scale score, 231; composite, 234, 235; smoothed composite, 238.

Index

- Scattering, and mental age, relation between, 168, 169; in psychopathy, 169.
- Scholastic retardation, 203.
- Segregation of delinquent defective, 206.
- Sterilization of delinquent defective, 207.
- Sex: love, 88; irregularity, 159; delinquency, 160, 175, 195; offense, 202.
- Snedden's vocabulary test, 264, 271.
- Sonoma (California) State Home for Feeble-minded, 74.
- Speed: factor, 239, 281; handicap, 243; of vision, 246; accuracy of relative importance, 247; time limits, 247, 281, 282; individual differences, 237, 238, 239.
- Standards, home, 260; social conditions determined by, 189 ff., 202, 204.
- Stanford-Binet test, comparison with other intelligence tests, 263, 265, 266, 267. *See also* Intelligence; Tests.
- Statistical constants derived from frequency distribution, 251.
- Subjects (human) of study: selection, 80; mental age, 80, 81, 82; number, 81; I.Q.'s, 81, 82; actual ages, 84; behavior, 84, 85, 92; mental and physiological condition, 85.
- Terman, L. M., cited, 80.
- Tests: in respect to labels: preliminary test of observers, 63; memory, by arrangement, 63, 64, 65, by price, 70, 71, 72; Goddard's 1911 Revision, used, 149, 153, 165; visual memory in motion-picture, 234; of speed, individual differences, 237, 238, 239; motion-picture, with other intelligence tests, 263; Stanford-Binet test compared with other intelligence, 263, 265, 266, 267; Jones-White, Practical-Judgment, 264, 272, 273; Snedden's vocabulary, 264, 271; management and arrangement of program for motion-picture, in rural communities, 278 ff.; instructions for, 279; interest value in, 280; directions for motion-picture, 281; greater validity of delayed motion-picture, 282. *See also* Intelligence; Intelligence Quotient; Motion-picture tests; Speed; Vocabulary.
- Truman, S. R., and Wever, E. G., *The Judgment of Pitch as a Function of the Series*, 215-223.
- Validity coefficients; correlation between motion-picture tests and Army Alpha intelligence tests, 254 ff.
- Variability, correction for, 255; coefficients, 262, 264.
- Vocabulary test, Snedden's, 264, 271.
- Venereal infection; higher percentage of, among defectives, 154, 203; dangers of, 159.
- Visual memory, growth and decline in Motion-picture tests, 234, 235, 238, 239, 242.
- Walker, Jean, *Factors Contributing to the delinquency of Defective Girls*, 147-213.
- Wever, E. G., and Truman, S. R., *The Judgment of Pitch as a Function of the Series*, 215-223.

UNIVERSITY OF CALIFORNIA PUBLICATIONS—(Continued)

Vol. 4.	1. A Preliminary Study in Discrimination of Maze Patterns by the Rat, by Joseph G. Yoshioka. Pp. 1-18, 1 figure in text. August, 1928	25
	2. The Effect of Change of Reward on the Maze Performance of Rats, by Merle Hugh Elliott. Pp. 19-30, 5 figures in text. October, 1928	25
	3. The Reward Value of a Conditioned Stimulus, by Katherine Adams Williams. Pp. 31-55, 4 figures in text. June 1929	30
	4. An Experimental Study of the Rat's "Insight" within a Spatial Complex, by Hsiao Hung Hsiao. Pp. 57-70, 2 figures, 2 graphs in text. September 1929	25
	5. Genetics of Learning Ability in Rats. Preliminary Report, by Robert Choate Tryon. Pp. 71-89, 1 figure in text. September 1929	25
	6. The Effect of Appropriateness of Reward and of Complex Incentives on Maze Performance, by Merle Hugh Elliott. Pp. 91-98. 2 figures in text. November 1929	25
	7. A Self-Recording Maze with an Automatic Delivery Table, by E. C. Tolman, R. C. Tryon, and L. A. Jeffress. Pp. 99-112, 14 figures in text. November 1929	25

EDUCATION.—W. W. Kemp, Leon J. Richardson, and Fletcher H. Swift, Editors.

Cited as Univ. Calif. Publ. Educ.

Volumes now completed:

Volume 1.	1893-1899.	424 pages	(Out of print)
Volume 3.	1903-1913.	447 pages	\$5.00
Volume 4.	1908	258 pages	(Out of print)
Volume 5.	1907-1920.	471 pages	4.00

Vol. 1.	Notes on the Development of a Child, by Millicent Washburn Shinn. 424 pages. 1893-1899. Reprinted in part, March, 1909	3.50
	(See also Volume 4, below.)	

Originally issued as *University of California Studies*, Volume 1. Pages 1-178 have been reprinted from the original plates, and a title page and table of contents added. The original edition is now exhausted. The reprinted edition is limited and the price has been changed to \$3.50.

Vol. 2.	1. Notes on Children's Drawings, edited by Elmer Ellsworth Brown. Pp. 1-74, 64 text-figures	(Out of print)
	(Published as <i>University of California Studies</i> , Volume II, No. 1, 1897.)	
	2. Reorganization and Administration of an Elementary School to Meet the Needs of a Community, by George C. Kyte. Pp. 77-144. January, 1925	1.25
	3. The Construction of Orientation Courses for College Freshmen, by Charles Tabor Fitts and Fletcher Harper Swift. Pp. 145-250, 4 figures in text. November 1928	1.30
	4. History of Entrance Requirements of the Liberal Arts Colleges of the University of California, by Peter Thomas Conmy. Pp. 251-337. December 1928	1.00
Vol. 3.	1. The Origin of American State Universities, by Elmer Ellsworth Brown. Pp. 1-45. April, 1903	.50
	2. State Aid to Secondary Schools, by David Rhys Jones. Pp. 47-150. December, 1903	.75
	3. Inherited Tendencies of Secondary Instruction in the United States, by Herbert Galen Lull. Pp. 155-281. April, 1913	1.25
	4. The Growth of Responsibility and Enlargement of Power of the City School Superintendent, by Arthur Henry Chamberlain. Pp. 283-441. May, 1913	1.75
	Index, pp. 443-447.	

Vol. 4.	Notes on the Development of a Child. II. The Development of the Senses in the First Three Years of Childhood, by Millicent Washburn Shinn. 258 pages. July, 1908	(Out of print)
	The index in this volume covers the material in both parts of the <i>Notes on the Development of a Child</i> , i.e., of volumes 1 and 4 of this series. Price for the two volumes together	(Out of print)

UNIVERSITY OF CALIFORNIA PUBLICATIONS—(Continued)

Vol. 5.	1. Superstition and Education, by Fletcher Bascom Dresslar. Pp. 1-239. July, 1907	2.00
	2. The Demonstration Play School of 1913, by Clark W. Hetherington. Pp. 241-288. July, 1914	.45
	3. The American State Reformatory, with Special Reference to its Educational Aspects, by Frank Fielding Nalder. Pp. 289-467, plates 1-9, 2 text figures. March, 1920	1.80
	Index, pp. 469-471.	

UNIVERSITY OF CALIFORNIA CHRONICLE.—The University of California Chronicle publishes authoritative and scholarly articles on subjects of current literary and scientific interest, including addresses delivered by distinguished visitors at the University and by members of the faculty at home and abroad.

The Chronicle is issued quarterly in January, April, July, and October, by the University of California Press. Volume XXX is the volume current in 1928. Subscription price, two dollars a year; single copies, fifty cents. Foreign postage, twenty cents a year additional.

ADMINISTRATIVE BULLETINS OF THE UNIVERSITY OF CALIFORNIA.—Edited by the Recorder of the Faculties. Includes the Register, the President's Report, the Secretary's Report, and other official announcements.

Address all orders, or requests for information concerning the foregoing publications, to The University of California Press, Berkeley, California.

